

COMPTON'S

PICTURED ENCYCLOPEDIA

AND

FACT-INDEX

INTERESTING • ACCURATE • UP-TO-DATE



To inspire ambition, to stimulate the imagination, to provide the inquiring mind with accurate information told in an interesting style, and thus lead into broader fields of knowledge—such is the purpose of this work

VOLUME 8

F. E. COMPTON & COMPANY • CHICAGO

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Here and There in This Volume

AT ODD TIMES when you are just looking for "something interesting to read," without any special plan in mind, this list will help you. With this as a guide, you may visit far-away countries and watch people at their work and play, meet famous persons of ancient and modern times, review history's most brilliant incidents, explore the marvels of nature and science, play games—in short, find whatever suits your fancy of the moment. This list is not intended to serve as a table of contents, an index, or a study-guide. For these purposes consult the Fact-Index and the Reference-Outlines.

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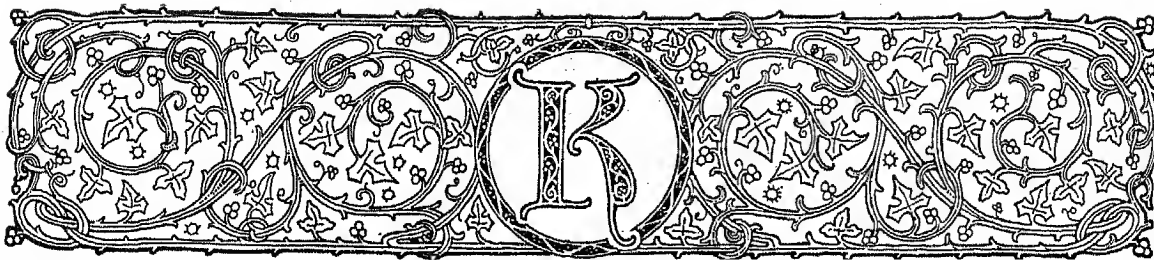
HERE AND THERE IN THIS VOLUME

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Key to Pronunciation

Pronunciations have been indicated in the body of this work only for words which present special difficulties. For the pronunciation of other words, consult the Fact-Index. Marked letters are sounded as in the following words: *cāpe, āt, fār, fāst, what, fāl; mē, yēt, fēr, thēre; īce, bīt; rōw, wōn, fōr, nūt, dē; cūre, būt, rūde, full, bār; ū* = French *u*, German *ü*; *gem, gō; thin, then; ñ* = French nasal (*Jean*); *zh* = French *j* (*z* in *azure*); *κ* = German guttural *ch*.



KAFIR. The type or group of grain sorghum called kafir or kafir corn was introduced from South Africa about 1876 and is now grown widely in the southwestern United States for grain and forage. It is particularly valuable in semi-arid regions where other grains, like corn, do not thrive. The juicy stem and leaves make excellent silage; the grain, about the size of popcorn and growing in a thick bushy head containing hundreds of kernels, is used for stock and poultry feed, and sometimes for human food, being comparable to cornmeal. (See Sorghum.)

KALEIDOSCOPE. This scientific toy, which presents a beautiful ever-changing series of bright colorful patterns, was invented by Sir David Brewster in 1817. In its simplest form it is a tube about 12 inches long and three inches in diameter. Through this tube run three joined mirrors, making a hollow triangle within the tube. At one end there is a little compartment which contains bits of glass of various sizes and shapes. The outer end of this compartment is clouded glass and the inner end is clear glass. At the other end of the outside tube is the eyeglass. When the tube is turned the colored bits fall into different positions and these, reflected in the mirrors, make the designs.

KAMCHATKA (*kām-chăt'ká*). From the tip of Siberia, opposite Alaska, the long bleak peninsula of Kamchatka extends south for about 750 miles. From its tip a chain of islands, the Kuriles (Chishima) connects it with Japan, about 700 miles southwest. Since the Aleutians approach it on the east, it is a steppingstone on a linked land-and-island route between the United States and Japan.

As a military position, it would be difficult to use, however, even for airplanes. In latitude and climate it is much like Labrador. Heavy snowstorms scourge it in winter. In summer it is beset with monsoon rains, and its coasts are often fog-bound. Although its area of about 105,000 square miles is equal to that of New England with most of New York, it supports only 25,000 or 30,000 native nomads and fishermen. Several thousand Russian settlers hold the land for

their country. Many of them are on state farms, which raise cattle and a few hardy crops. The principal port and town is Petropavlovsk. Many Japanese fishermen normally visit the land every summer, to catch salmon in the rivers, and cod, herring, smelt, crabs, and lobsters off the coast.

The backbone is a ridge of mountains, about 3,000 feet high, down the middle. In the southeastern portion is a higher ridge, crowned with volcanoes. Some of these are active. Klutchevskaya (16,130 feet) is the highest peak in Siberia.

The mountain slopes bear cool-climate trees, such as willows, birches, larches, and firs. The valleys and flat coast lands are Arctic tundra. They afford berries in the short summer from July through August. Reindeer are common, and a mainstay of food for the natives. The animals include the brown bear, sable, otter, fox, hare, wolf, and goat antelope.

KANGAROO. When Captain James Cook was exploring the coast of Australia in 1770, his men were amazed by a strange animal. At times it stood upright, braced on its hind legs and huge tail. It moved by taking prodigious leaps. Thus white men first met the great gray kangaroo, the "boomer" or "old man" of Australia.

More than 100 species of the kangaroo family live in the open spaces of Australia, New Guinea, and neighboring islands. They belong to the marsupial order (animals that carry their young in pouches). It is distinguished from the other marsupial

families by a remarkable adaptation of body form for jumping. The kangaroo family must not, however, be confused with the so-called kangaroo rats, the jerboas, and similar jumping rodents of America, Africa, and Asia.

The great gray kangaroo reaches a weight of 200 pounds and a length of ten feet from nose to tip of tail. The tail alone is about four feet long, and the powerful muscles at the base make it nearly as thick as the animal's body. On each of the hind feet are four toes. The second from the outside is much stronger and longer than the others and ends in a huge claw.

GREAT GRAY KANGAROO
ON GUARD



The proportions of this animal tell a plain story of adaptation. The hind-quarters used in jumping are enormous. The forequarters, idle weight in traveling, are small and light.

This toe and the shorter outside toe are used in jumping. The two slender inside toes are closely joined by a growth of skin and are used only for scratching.

The great gray kangaroo can clear more than 20 feet at a single bound, but it attains its highest speed with shorter, quicker jumps. It can leap easily over rocks and bushes that will turn aside hunting dogs and horseback riders.

Three-fourths of the animal's bulk lies in its hindquarters. The front legs are short and slender, with small five-toed paws. These are used in feeding but are drawn up against the breast in jumping.

How Young Develop

The female has a large pouch on the abdomen formed by a fold in the soft furry skin. When the single, inch-long, naked young is born, it finds shelter in this pouch. There it attaches itself to one of the

mother's nipples, which swells inside its mouth so that for several weeks the young kangaroo cannot loosen its grip. It is unable at first to draw out milk for itself or to swallow it. The mother is provided with muscles for pumping her milk down the tiny throat.

After about four months the young kangaroo, called a "joey" in Australia, is able to lean out of the sheltering pouch and nibble grass when its mother bends over to graze. Presently it climbs out and learns to hop around in search of food, but continues for several weeks longer to climb back into the pouch for sleep and safety. If a sudden danger threatens while the young kangaroo is some distance away, the mother will start toward it at full speed, gather it up in her forepaws as she passes, and tuck it into her pouch without seeming to check her flight.

Nearly as large as the great gray kangaroo are the red kangaroo and the more stocky wallaroo. Next in size are various species popularly known as wallabies. These larger types are usually found in small groups or "mobs" that move from place to place, feeding on grass, shrubs, and the leaves of small trees. Their keen noses, ears, and eyes warn them of danger from hunters or from dingoes or wild dogs—their only important foes. Kangaroos are hunted because of the damage they do to crops

HOW MOTHER CARRIES YOUNG



This young kangaroo has nearly outgrown its mother's pouch. But it will continue to seek warmth and shelter there until the mother refuses to carry it any longer. When it is about ten months old the mother will leave it.

and for their tender flesh and their skins which produce fine leather.

Timid as it is, the kangaroo fights desperately when cornered. With its front paws it tries to push attackers down within reach of a forward slashing blow from the terrible claws on its back feet. It can rip a dog to death with a single stroke. When pursued by a pack, a kangaroo sometimes takes to the water and, if a dog swims out in pursuit, the kangaroo seizes it and holds it under the surface until it is drowned.

The smaller kangaroos, such as the rock wallabies, the hare wallabies, and the rat-kangaroos, live in secluded retreats among cliffs or dense thickets. A few species have become adapted to tree life. These tree kangaroos have much shorter hind legs and longer forelegs than the others of the family. They do not hop but climb among the branches like small

slender bears. Some of these smaller kangaroos eat berries and small insects as well as grass and leaves.

Fossil remains of about 30 kangaroo species have been found in Australia. Among them were giant types, one of which is estimated to have stood ten feet tall.

Scientific Classification

Kangaroos constitute the family *Macropodidae* of the marsupial order (*Marsupialia*). The great gray kangaroo is *Macropus giganteus*. Representatives of other marsupial families are the phalangers (*Phalangeridae*), including the cuscus, the koala, and several Australian opossums; the wombats (*Phascolomyidae*); the bandicoots (*Peramelidae*); the dasyures (*Dasyuridae*), including the Tasmanian wolf, the Tasmanian devil, and the banded ant-eater; the marsupial mole (*Notoryctidae*); and the true opossums (*Didelphidae*), including the common opossum of North America and several South American species.

The helplessness at birth described above in the case of the great gray kangaroo is typical of all marsupials. The young do not reach inside the mother's body the same degree of development as do the young of the higher mammals. They are born sooner and complete the early stages of their development in the mother's pouch. Marsupials are also distinguished by peculiarities of bones and teeth.

The place of the marsupials in the evolutionary scale lies between the most primitive egg-laying mammals, such as the duckbill and the spiny ant-eater of the order *Monotremata*, and the higher orders which include all the remaining mammals. (See also Australia; Duckbill; Opossum; Tasmania.)

WHEN THE KANGAROO FEEDS



See the long hind feet flat to the ground and the forepaws used like hands to grasp food.

The "SUNFLOWER" STATE'S Fertile PRAIRIES



Nodding Heads of Kansas Wheat Usually Take the Lead in Supplying the Bread of the Nation

KANSAS. The "sunflower state" occupies the geographical center of the United States. Its rolling prairies are slightly uptilted toward the north and west. Here and there—especially in the west and south—they become mesas and tablelands broken by deep cuts, almost canyons. The meager streams are never navigable, and the smaller ones often fail entirely in summer. Yet the valleys are wide, and in Indian times they determined the course of tribal wanderings. The two great highways of transcontinental travel before the railroads were built—the Santa Fe Trail and the Oregon Trail—followed the course of river valleys across the future state of Kansas. Along their borders, wherever the white man disturbed the soil, sprang up the hardy Kansas pioneer, the sunflower.

Kansas has no mountains, no marshes (except a few salt marshes), and only a few small and shallow lakes, or rather ponds.

Except in the northeast corner where Kansas touches the Missouri River, the boundaries of the state are not determined by natural geographical features. They are the result of a political experiment in the days when the nation was divided over slavery (see

Extent.—East to west, 408 miles; north to south, 208 miles. Area, 82,276 square miles. Population (1940 census), 1,801,028.
Natural Features.—Prairies, rising to 4,135 feet. Principal rivers: Kansas (tributaries, Republican, Solomon, and Smoky Hill), Arkansas. Mean annual temperature, 55°; precipitation, 27".
Products.—Wheat, corn, hay, barley, potatoes; cattle, hogs; meats, flour and mill products; petroleum, gas, zinc, salt, coal.
Cities.—Kansas City (121,458), Wichita (114,966), Topeka (capital, 67,833).

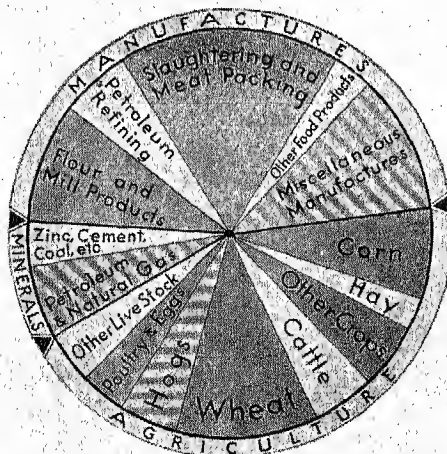
Kansas-Nebraska Act). But included within those boundaries is some of the most fertile soil in North America—rich, dark, and 300 feet thick in certain

places. Indeed, it is so rich that fertilizers find but a scanty market there, but early explorers believed these vast plains to be incapable of cultivation, and settlers long feared the fierce extremes of the mid-continental climate. Many pioneers carried out of Kansas harrow-

ing tales about its tornadoes and grasshoppers, floods and droughts. Other settlers stayed on, adapted themselves to conditions, and reaped such harvests from their farms that the name of Kansas became a symbol of prosperity. And Kansas has held its position as an important agricultural state—even during the years of the severe droughts which began in 1930 (see Drought).

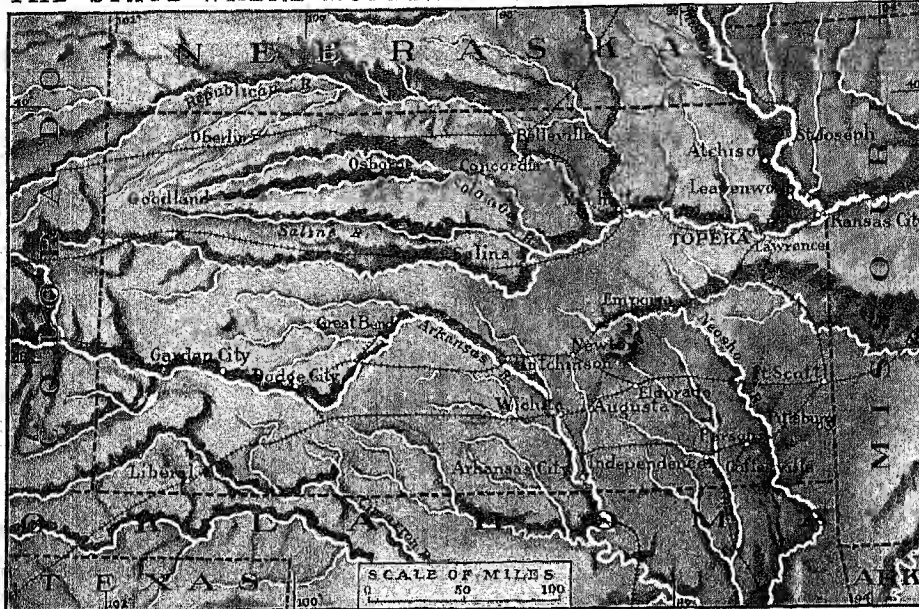
In the eastern part of the state the rainfall, averaging about 40 inches, is sufficient for crops, and the crops of a good year will make up for the poorer crops of an off year. The west-

ern end, where the rainfall is scanty—only about 15 inches—is underlain by a vast sheet of underground water. Here splendid crops of winter wheat, alfalfa, kafir corn, and sugar beets have been raised by sub-surface irrigation together with summer fallowing.



Relative Value of Kansas' Products

THE STATE WHERE ROLLING PRAIRIES YIELD FORTUNES



AGRICULTURE

TRADE AND
TRANSPORTATIONOTHER
OCCUPATIONS

In its early days Kansas was considered almost a desert, and many stories were told of the appalling hardships endured by its inhabitants. One who visits the state now will wonder how such tales originated, for the farmers have made its prairie-land into one of the richest farming districts in the world. Trees are abundant, and the old Kansas "desert" now blooms like the rose.

There is perhaps no state where intelligence in farming is better rewarded than in Kansas, and none where intelligence is more absolutely necessary to success. This may be why the number of students in the state agricultural college is exceptionally high in proportion to the population of the state, and also why the state board of agriculture, which is organized on a non-political basis, is an exceptionally active body with a remarkably efficient system of crop-reporting.

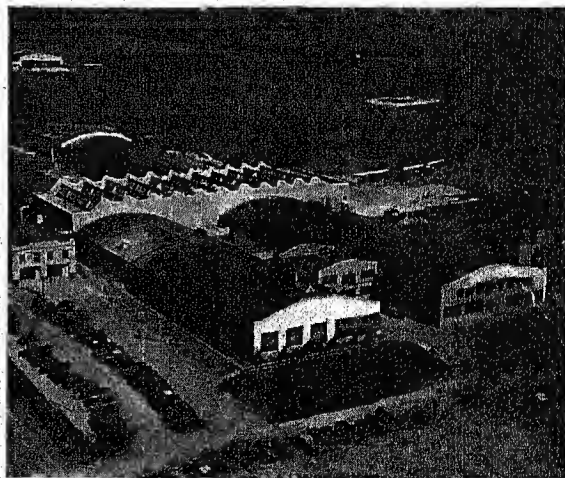
The hard Turkey Red wheat for which Kansas is famous is descended from seed brought to the state during the 70's of the last century by Mennonite immigrants from the Crimea. It has proved to be especially well adapted to Kansas soil and climate, and makes a very high grade of flour. The state agricultural college by breeding thousands of strains of this wheat has evolved a variety which gives an even higher yield per acre than the old Turkey Red. So extensively is Kansas wheat used for "blending" with other kinds that it is said that almost every sack of high-grade flour produced in the United States contains some Kansas hard winter wheat.

In the production of winter wheat Kansas is far ahead of any other state; and in total wheat yield it sometimes passes even North Dakota. The state's record for the years 1918 and 1919 is a remarkable one, which deserves to be remembered for the difficulties under which it was achieved as well as for its contribution toward winning the war with food.

Two bad seasons (1916-17) had exhausted the resources of many farmers; the banks had made loans up to their legal ability to do so. The state board of agriculture early in the year found that the wheat acreage would be contracted in the fall unless aid were extended to the farmers, because those whose crops had failed were unable to purchase seed wheat. The board secured an appropriation from the president's special emergency fund for seed wheat loans, not only in Kansas, but also in Oklahoma, Texas, and New Mexico. With a

loan of nearly \$1,000,000 to spend for seed, Kansas planted over 10,000,000 acres—an area nearly as large as the land surface of Massachusetts and

ONE OF WICHITA'S AIRPORTS



"The cross-roads of the air" is the new life of Wichita, one of whose well-equipped airports is shown above. Here the New York-Los Angeles planes meet those flying the route from Texas to Chicago. Its flat ground for landing fields, freedom from fogs, and central location secure its importance in aviation.

Connecticut combined—to winter wheat, and harvested in 1919 a crop of 150,000,000 bushels—the largest crop of any state in the Union that year—to

WHERE KANSAS MAKES ITS LAWS



Here is the handsome state capitol in Topeka, where the Kansas legislature gives expression to the progressive ideas of the state. Kansas has long been known as a state of experiments, and is credited with many innovations such as "blue sky" laws, which were derided at first, but afterwards found general favor throughout the nation. Perhaps the state caught the innovating habit from the circumstances of its foundation, for from the first Kansas has been a battlefield of conflicting ideas—the sort of soil which history shows to be most favorable to growth and progress.

help feed the starving millions of the world that sent their plea to the United States for food when the nations laid down their arms.

Besides wheat, the principal crops raised in Kansas are corn, oats, rye, barley, hay, sorghum, and potatoes. The state is also a leader in broom corn. Grazing is an important industry, particularly in the western part of the state, where the insufficient rainfall makes cereal crops uncertain without irrigation. Kansas City provides an accessible market for beef cattle, and dairying is also carried on extensively.

"Crops" that Underlie the Farms

The chief minerals are fuels—coal, petroleum, and natural gas. The principal coal-producing region is in the southeast corner of the state, centering around Pittsburg. Petroleum and natural gas were first found in splashes running from northeast to southwest at the outer border of the coal region. The original territory has begun to be exhausted, but Kansas has now become one of the chief petroleum-producing states through the discovery of new oil fields in the southeastern counties. El Dorado is one of the most productive oil centers and a new field of great promise has recently been brought in near Wichita. Kansas is among the leading states in the production of zinc and salt. Gypsum, limestone, sandstone, lead, cement, and brick clay are other mineral products of some importance. Much of the brick and cement finds use in the construction of the fine roads for which Kansas is noted.

Lacking iron, Kansas uses only about a third of the coal it produces. The chief manufactures are

slaughtering and meat-packing and the milling of flour and grist-mill products. Both of these industries are extensively carried on in Kansas City (*see* Kansas City, Kan.) and Wichita, the second manufacturing city of the state. Topeka, the capital, has large railroad-car shops and flour and grist-mills, and manufactures dairy products on a large scale. Leavenworth, a former "squatter town," now has important manufactures, including foundry works and brick yards. The manufactures of Lawrence, which suffered so much during the bloody border battles and which is now the seat of the state university, include flour, brick, and paper. Other manufactures of the state are portland cement, glass, and salt.

But agriculture is by far the greatest industry. There are few large cities, although the urban population is increasing. Kansas is one of the most purely American of states, more than 90 per cent of its population being American born.

A State that Does Its Own Thinking

The state has produced no great geniuses, yet there is sprinkled over it as a whole enough of the salt of difference—of nonconformity—to go far toward the seasoning of several geniuses. When Kansas has made up its mind, it doesn't care what the rest of the world thinks, and so it is not hindered by self-consciousness or fear of ridicule from putting into practice any unheard-of thing that Kansans believe is for the good of the community. Sometimes they have to undo what they have done and start over again, but Kansas farmers long since learned to plow up and plant over again, when necessary, without making any fuss about it. And it is rather surprising, after

A PARADISE FOR CATTLE



In addition to her great wheat farms, extending like green or golden seas to the horizon, Kansas has great stretches of pasture lands devoted to stock raising. Wooded river bottoms such as these are particularly suitable for cattle breeding and dairy farming.

all, how many of the once ridiculed Kansas innovations, like "blue sky" laws and woman suffrage and abolition of disease-spreading common towels and cups, have been adopted on sober second thought by the nation.

The first white man who saw the broad plains of Kansas was Coronado, who with his company of Spanish explorers traversed this region in 1541. All of the present state except a small corner in the southwest came into the possession of the United States in 1803 as part of the Louisiana Purchase (see Louisiana Purchase).

KANSAS CITY, KAN. Only an imaginary state line divides the largest city of Kansas from its twin city on the Missouri side. The two cities are one industrially and commercially and are served by the same street-car line, the same telephone system, and, for the most part, by the same union railway terminal. The Kansas metropolis lies on both sides of the Kansas River, to the west of Kansas City, Mo., rising in the west to bluffs and hills upon which much of the residence portion of the city is built. The bottom lands in the river valley are the seat of many great industries and factories, chief of which are the slaughtering and meat-packing establishments. Owing to their position among the corn and beef states of the southwest, the two Kansas Cities rank together as the second live stock market in the United States, after Chicago.

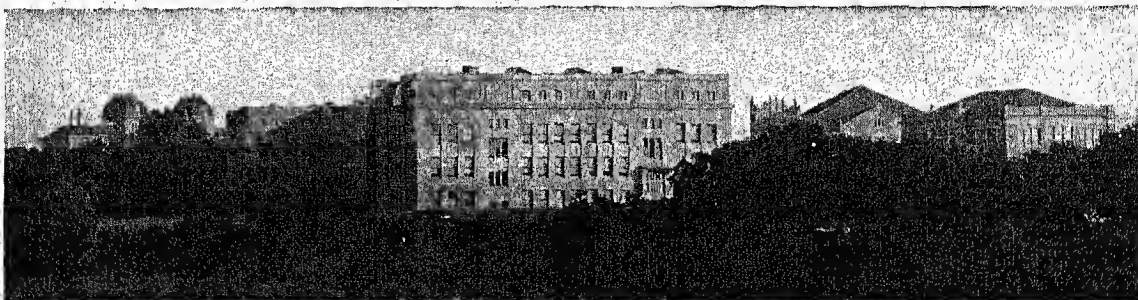
They also manufacture soap and candles and various other articles subsidiary to the packing industry.

The advantages of natural gas and oil, combined with excellent railway facilities, have helped greatly in building up the industries of Kansas City, Kan. In addition to its stockyards it has large flour mills and grain elevators, oil refineries, iron and steel works, foundries, and lumber and brick yards. An airport serves military aircraft of the United States. There are several large parks. In the business district, adjoining Huron Park, a Wyandotte Indian cemetery is still preserved. These Indians were the original settlers of the district and Wyandotte was the largest of a number of small towns which combined in 1886 to form Kansas City, taking the name of the Missouri town. In 1909 the city adopted the commission form of government. Population (1940 census), 121,458.

KANSAS CITY, Mo. Missouri's second largest city is the market place and manufacturing center for a vast area of the West and Southwest. It lies on the western boundary of the state, at the point where the Kansas River enters the Missouri River. Here the winding Missouri leaves the state border and turns sharply eastward.

This location has been a natural trading center for more than a hundred years. Fur trappers along both rivers brought their pelts to the bend where François Chouteau had established a trading post in 1821. It

WHERE KANSAS EDUCATES ITS YOUNG MEN AND WOMEN



These buildings form part of the University of Kansas at Lawrence. To the left is Fraser Hall, the center shows the large Administration Building, while to the right are the Robinson Gymnasium and Haworth Hall, devoted to mining, engineering, and geology. In addition to its educational work, the university furnishes many advisers on technical subjects to the state government.

became a transfer point between river traffic and overland transportation. The Oregon and Santa Fe trails started here. Settlers coming upstream by boat outfitted their wagons at Independence and Westport Landing for the long journey to the Far West. By 1849 both frontier settlements were doing a thriving business. Westport Landing in 1853 became Kansas City.

When railroad building began in the middle 1800's, their routes followed the valleys that slope gently toward the mouth of the Kansas. It is said that a boxcar, given a push from any point within 200 miles, will slide down into the city. Today 12 trunk-line railroads and a network of modern highways, river barge lines, and air lines gather and distribute the wealth of the Middle West.

Kansas City's industries have developed out of the rich agricultural lands which surround it. Lying between the range country of the West, where cattle are raised in great numbers, and the corn belt states, where they are fattened, it became a big live-stock market. Together with its twin city across the state line in Kansas, it forms a meat-packing center second only to Chicago (see Kansas City, Kan.). Important by-products of the meat-packing industry include soap, gelatin, oleomargarine, and leather goods. It is the largest winter wheat market in the world, and with Kansas City, Kan., holds third place in flour milling, following Buffalo and Minneapolis. Other milling products such as cereals and live-stock feeds are manufactured. Iron and steel products, petroleum products, and airplane engines are also made here.

Kansas City is beautifully situated on bluffs which rise in terraces above the river bottoms. A \$40,000,000 boulevard system links the various sections of the city. Cliff Drive, winding for several miles along the Missouri, commands a wide view of river, valley, and bluff. In the heart of the business district is the Civic Center, a broad plaza flanked by the City Hall and the Courthouse. Near by is the Municipal Auditorium. Its Music Hall is the home of the Kansas City Philharmonic Orchestra. The Union Station is one of the largest and best-designed railway stations in the country. Facing it across a plaza stands the impressive Liberty Memorial, a shaft of limestone 217 feet high.

The William Rockhill Nelson Gallery of Art and the Atkins Museum of Fine Arts occupy a beautiful classic building in a landscaped setting of 20 acres on the site of the Nelson home. They were endowed by the fortune of the journalist, founder of the Kansas City Star, and by a bequest of Mrs. Mary Atkins. Near by is the Art Institute. Thomas Hart Benton was long a member of its faculty, and one of its most famous students was Walt Disney, creator of the Mickey Mouse cartoons. To the south, across Brush Creek Valley and a stretch of wooded land, is the campus of the University of Kansas City.

The city-manager form of government was adopted in 1925. The population has increased from less than 4,000 in 1860 to 150,000 in 1900, and 399,178 in 1940.

KANSAS-NEBRASKA ACT. The Kansas-Nebraska Act, passed by Congress in 1854, has been pronounced the most momentous piece of legislation in the United States before the Civil War, for it set in motion the train of events which led directly to the conflict over slavery. In January 1854, with the support of President Pierce, Senator Stephen A. Douglas of Illinois laid before the Senate a report of the Com-

mittee on Territories which provided for the organization of the territories of Kansas and Nebraska, allowing the people of these regions to decide for themselves whether they would allow slavery within their borders. The opponents of the bill said that the principle which it contained was that of "squatter sovereignty." The bill as finally enacted into a law expressly repealed the Missouri Compromise which had prohibited slavery north of latitude 36° 30'—a compact which for a whole generation had been regarded as a binding agreement between the people of the North and the South.

The news that such an act was contemplated fell like a thunderbolt upon the people of the North. Mass-meetings were held to denounce the measure; ministers preached against the "Nebraska iniquity;" and Douglas was accused of weakly yielding to the South in the hope of winning the presidency.

In spite of the anger of the North the bill was passed by Congress on May 30, 1854. The fight over slavery was then transferred to the two territories. Pro-slavery men of the South and anti-slavery men of the North rushed into Kansas, each side determined to win the state. The first elections, in 1855, were carried by the settlers from the South, aided by the "Border Ruffians" of Missouri who had crossed the border the night before election and had taken possession of the polls, illegally casting their votes for a pro-slavery candidate for governor. The settlers from the North refused to abide by the result of this fraudulent election. They held one of their own, at which the pro-slavery men refused to vote. As a result two rival governments were set up in the territory, and a veritable civil war ensued, in which the anti-slavery party under the leadership of John Brown retaliated with violence to the violence of the pro-slavery men. The attention of the whole country was fixed on "Bleeding Kansas." The advantage lay with the settlers from the South, for they had the support of President Pierce, who eventually sent United States troops into the territory to quell the disturbance and to disperse the free-state legislature. A new election was then called, and again the illegal methods of the pro-slavery party won the day. But Congress refused to recognize as legal the constitution adopted by such methods, and Kansas was forced to remain a territory a while longer. As time went on, the free-state settlers became more numerous, and finally the South gave up the attempt to make Kansas a slave state. A new constitution was then drawn up, and on Jan. 29, 1861, on the eve of the Civil War, Kansas was admitted to the Union as a free state.

KAPOK (*kā'pōk*). From the branches of the ceiba tree dangle pods filled with silky fibers called kapok. These fibers are extremely fine air-filled tubes, and this is what makes them valuable. Kapok is used in stuffing mattresses and upholstery, for insulating aviators' clothing and refrigerators. In a life preserver, it supports 25 to 30 times its own weight (cork supports only about six times its weight). Highly

inflammable, kapok can be rendered reasonably fire-proof by a simple chemical treatment.

The ceiba tree grows in all tropical and semitropical climates, but thrives best at altitudes of less than a thousand feet and on porous volcanic soil. Putting up very straight for 30 or 40 feet, with its few limbs sticking out horizontally and parallel to each other, it resembles a child's first sketch of a tree.

Most kapok comes from Java and Central America. Less than 10 per cent is grown on plantations; the rest trickles to market from wild trees, for natives gather it much as American pioneers did wild honey—profiting while investing nothing. When seedlings are set, they anchor themselves by sending down a long tap root. In five to seven years they are producing. In September, when the pods begin bursting, the fiber is pulled out and taken to market. Here it is cleaned, sorted, and baled for export. A mature tree yields about 7,000 pods, or 60 pounds of cleaned floss; also about 135 pounds of seeds. The seeds furnish oil for soap. The down of milkweed can serve as a substitute for kapok (see Milkweed).

KASHMIR. In the north of India, reaching from the plains of the Punjab

northward over the western Himalaya ranges to the borders of Tibet, lies the beautiful mountainous region of Kashmir (or Cashmere). It is a country of wild and gorgeous scenery, of splendid snow-crowned summits cut by deep gorges and valleys filled with rich and varied vegetation. It is traversed by the Indus River, and in the southwest the valley of the upper Jhelum widens to form the famous Vale of Kashmir, celebrated in Thomas Moore's poem 'Lallah Rookh'—an oval basin 84 miles long and about 20 miles wide engirdled by mountain spurs which rise 14,000 and 15,000 feet above sea level. Its marsh lands and flooded rice fields mirror the glory of the peaks, and for miles along the valley the road threads its way past lake, river, hill, and temple. Within the vale lies the capital and largest city of Kashmir, Srinagar.

Although Kashmir has an area of nearly 85,000 square miles, much of it is wild uninhabited moun-

tain country, and the greater part of the population of more than 3,645,000 is gathered in the southwestern part. Its cool healthful climate has made it a famous summer resort for Europeans in India, and much of the prosperity of the natives is due to these visitors. From the wool of its goats, yaks, and wild sheep were made the celebrated Cashmere shawls, which first became fashionable in the reign

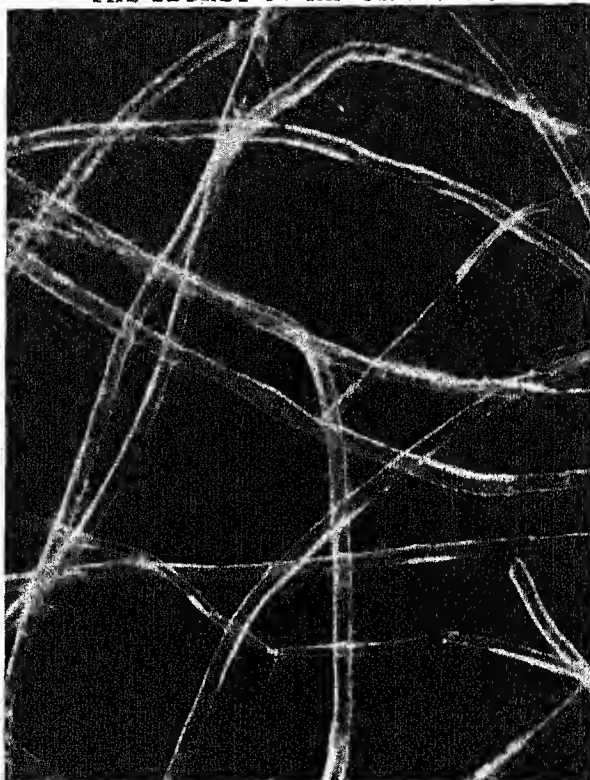
of Napoleon. The great shawl industry was ruined, however, by the failure of the Paris market during the Franco-Prussian War of 1870-71, and the famine of 1877 scattered the weavers. The Cashmere carpet has to some extent replaced the shawl, but the most thriving industry today is silk weaving. Rose fields in the Vale of Kashmir give the finest attar, and Srinagar is noted for its silver work and wood carving. The staple crop is rice, but corn, wheat, barley, and oats are also grown.

The natives are a fair well-featured race, with all the characteristics of the Afghans and northern races, but they are educationally very backward, with 98 per cent illiterates. The *Kashmiri*—as they are called—are chiefly Moslems, though Hindus, Buddhists, and Sikhs are a strong minority.

Owing to its mountain seclusion, a little out of the path of the many invaders that swept India from the northwest, Kashmir has known few political changes. It was an independent monarchy until 1586. Thereafter for almost 300 years the state was ruled by a succession of Moguls, Afghans, and Sikhs. In 1846 it came under British control, and later organized as the state of Jammu and Kashmir. A British resident lives at Srinagar, but internal affairs are largely left to the maharajah, as the native ruler is called.

KATYDID. Throughout the late summer nights the katydid sings unceasingly in the tops of the tallest trees, "*Katy did; Katy didn't; she did; she didn't.*" It is one of the most vigorously musical of all of our long list of insect songsters. It is said by dwellers in the country that from the time the first katydid sings to the first autumn frost will be a period of six weeks, a prediction often fulfilled.

THE SECRET OF KAPOK'S VALUE



These are kapok fibers magnified 110 times by a microscope in the laboratory of the Dry Zero Corporation. The photograph shows clearly that the fibers are delicate air-filled tubes. This inner-air space accounts for their buoyancy and insulating properties.

Only the male katyids are the music makers, and the song which they sing is the mating call to the females. The tone is produced by rubbing a scraper at the base of one of the front wings across a file on the base of the other. The sound will often carry a quarter of a mile on a still summer night. Catch a "katy" and put him underneath a tumbler, and when he has got over his fright he will give you a fine concert, and moreover show you just how he plays his curious wing fiddle.

Katyids are of a delicate green hue that almost exactly matches the green of the leaves wherein they hide. The hind legs are the longest and most powerful, which makes the katydid, like its cousin the grasshopper, a very good jumper. The two antennae or feelers upon the head are very long and fragile. The body is rather broad, and boat-shaped, and the wing covers are delicate and thin—not heavy like those of the grasshopper.

Katyids lay eggs in regular rows, early in autumn, which may be found on twigs, branches, leaves, and edges of fence boards, securely gummed in place by a glue which the female secretes. When

ready to hatch, in the following spring, each egg splits along the top, and the young "katys" squirm out. At first they are very pale in color, but they soon assume the leaf-green tints of the adult. In the South there are usually two broods a year, due to the length of the summer season. In the North there is but one. There are several species, all peculiar to North America and none especially harmful to vegetation.

The katydid belongs to the great order of the *Orthoptera*, or straight-winged insects, which also includes grasshoppers, crickets, and "walking-sticks." The angular winged katydid of the western and southern states is *Microcentrum retinervis*.

KEATS, JOHN (1795-1821). "Here lies one whose name was writ in water." This is the epitaph which the great English poet, John Keats, wrote for himself in the melancholy days when he felt his death approaching, and despaired of winning that fame for which he so ardently longed. Keats lived only a little more than 25 years and his whole poetical career was but seven years long, yet during this brief period he wrote some of the greatest poems in the English language, crowded with lines of exquisite and haunting beauty that will live as long as the language is spoken.

John Keats was the son of a livery-stable keeper. He passed his early years, not close to nature as did most of our poets, but in the city of London, and yet in some marvelous manner there was born in him an intense love of beauty. "A thing of beauty is a joy forever" is the first line of his 'Endymion', and in his 'Ode on a Grecian Urn', in which he seems indeed to have caught much of the ancient Greeks' worship of beauty, he declares:

Beauty is truth, truth beauty,—that is all
Ye know on earth, and all ye need to know.

Beauty was all in all to Keats. Unlike his great contemporaries Shelley and Wordsworth, he had no desire to reform the world or to teach a lesson. He was content if by his magic power he could make us see and hear and feel with our own senses those marvelous forms and colors and sounds that his imagination

bodies forth. Yes, in what is perhaps the richest of all his poems—'The Eve of St. Agnes'—he even makes us taste the—

. . . jellies soother
than the creamy
curd,
And lucent syrups,
tinct with cinna-
mon.

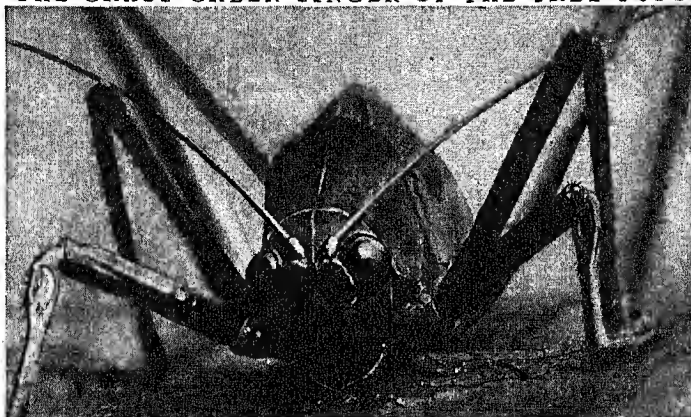
Keats was apprenticed to a surgeon in early youth, and studied surgery faithfully for seven years, but his heart was

elsewhere. "I find I cannot exist without Poetry," he said,—"without Eternal Poetry." In 1816 he became acquainted with Leigh Hunt, Benjamin Haydon, the painter and through Hunt with Shelley. In the following year at 22 he gave up his profession and devoted the rest of his short life to poetry.

In 1818 his first long poem, 'Endymion', appeared. It was bitterly and harshly attacked by the reviewers, who overlooked its beauties and failed to see that its faults were due to immaturity. Other troubles crowded upon the young poet. He was in money difficulties, and worst of all he was tormented by a hopeless love affair. His health had begun to fail and he rapidly developed consumption. In the autumn of 1820 he went to Italy and early in the following year he died at Rome.

Keats' chief poems are: 'Endymion'; 'Lines on the Mermaid Tavern'; 'Isabella, or The Pot of Basil'; 'I Stood Tiptoe upon a Little Hill'; 'The Eve of St. Agnes'; 'La Belle Dame Sans Merci'; 'Ode to a Nightingale'; 'Ode to Autumn'; 'Lamia'; 'Hyperion'; and a number of sonnets, among which are 'On First Looking into Chapman's Homer', 'When I Have Fears That I May Cease to Be', and 'Bright Star, Would I Were Steadfast As Thou Art!' All were published between 1817 and 1820.

THE GRASS-GREEN SINGER OF THE TREE TOPS



Here is a katydid, munching contentedly upon a leaf high up in the tree tops. By rubbing together a scraper and file mounted at the base of his wings, he cheerily calls his name; and he listens with those disk-like ears on his front legs.

KELLER, HELEN ADAMS (born 1880). "Once I knew only darkness and stillness. . . . My life was without past or future. . . . But a little word from the fingers of another fell into my hand that clutched at emptiness, and my heart leaped to the rapture of living." Thus Helen Keller describes the beginning of her "new life," when despite blindness and deafness she learned to communicate with others.

She was born June 27, 1880, at Tuscumbia, Ala. Nineteen months later she had a severe illness which left her blind and deaf; she also lost the power of speech. When she was six, her parents, who had read Charles Dickens' account of the splendid work done with another blind and deaf girl, Laura Bridgman, took her to see Alexander Graham Bell. As the result, Anne Mansfield Sullivan (who became Mrs. John Albert Macy in 1905) began to teach Helen Keller on March 3, 1887. For almost 50 years—until her death in 1936—she remained Helen's teacher and constant companion. Miss Sullivan herself had been almost blind in early life, but her sight had been partially restored.

Both teacher and pupil were remarkably gifted. Helen soon learned the finger-tip, or manual, alphabet, as well as braille. By placing her sensitive fingers on the lips and throat of her teachers, she learned to "hear" them speak. Three years after mastering the

manual alphabet, she even learned to speak herself. She also learned to typewrite.

At the age of 20 she was able to enter Radcliffe College, where she received her Bachelor of Arts degree in 1904. She used textbooks in braille, and Miss Sullivan attended classes with her and spelled the lectures into her hand.

After graduation Miss Keller served on the Massachusetts Commission for the Blind. In 1931 she helped raise \$1,000,000 for the American Foundation for the Blind. Before long she became widely known as a writer and a lecturer. Her writing is colorful and poetic; it reveals keen interest in the beauty of things too often taken for granted by those who can see and hear. She traveled widely, and met many notable people.

Others with similar handicaps have learned to communicate with their fellows. Miss Keller, however, was distinguished by the depth of her character. Working at her home near Westport, Conn., she devoted her life to the service and encouragement of the unfortunate, and especially to the cause of the blind and the deaf. (See *Blind, Education of*.)

Miss Keller has told her experiences in several books, including, 'The Story of My Life' (1903); 'Optimism' (1903); 'The World I Live In' (1908); 'Out of the Dark' (1913); 'Midstream: My Later Life' (1929); 'Journal' (1938); 'Let Us Have Faith' (1940).

In OLD KENTUCKY, the Bluegrass STATE



Horses Thrive on the Rich Pasture Land of the Bluegrass Region

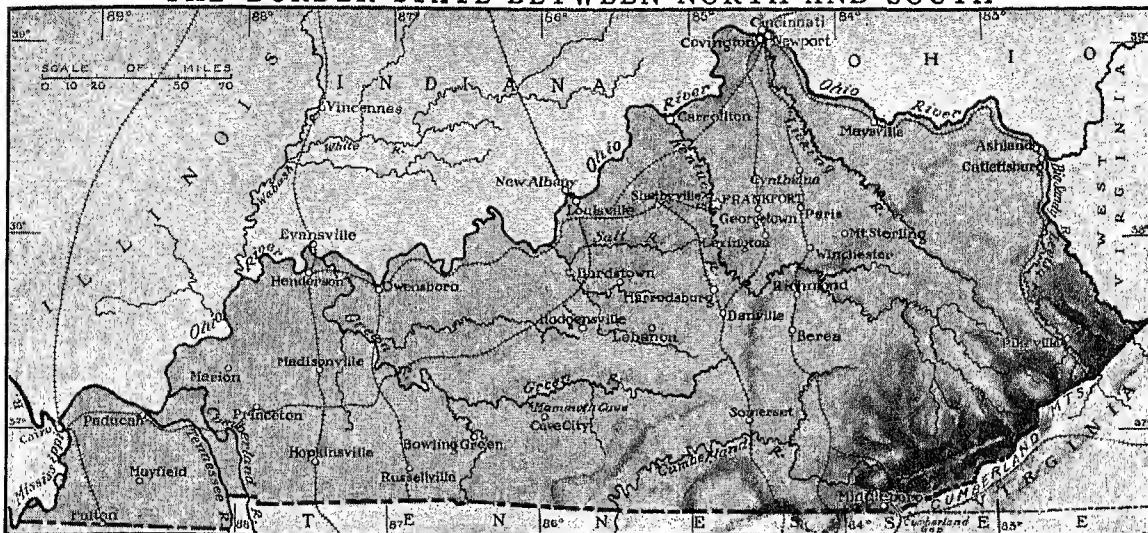
KENTUCKY. Marked contrasts in its geography endow Kentucky with rare natural beauty. These contrasts also account in large measure for the varied riches of the state and its romantic history. It stretches from the Cumberland Mountains westward to the Mississippi River. Its southern boundary is an almost straight line, established nearly 300 years ago when Kentucky was a part of Virginia Colony and Tennessee was a part of Carolina Province. The northern boundary is formed by the Ohio River.

Extent.—East to west, 416 miles; north to south, 176 miles. Area, 40,395 square miles. Population (1940 census), 2,845,627.
Natural Features.—Cumberland Mountains and Plateau (Big Black Mountain, 4,150 feet) in east; in center, blue grass plains; in extreme west, fertile river bottoms. Principal rivers: Big Sandy, Licking, Kentucky, Green, Cumberland, and Tennessee, all flowing into Ohio River, which forms northern boundary. Mean annual temperature, 56°; mean annual precipitation, 46".
Products.—Tobacco and tobacco products; corn, hay, hogs, cattle, and horses; coal and petroleum; flour and meat products; hardwood lumber, and timber products; iron and steel manufactures.
Cities.—Louisville (319,077), Covington (62,018), Lexington (49,304), Paducah (33,765), Newport (30,631), Ashland (29,537), Frankfort (capital, 11,492).

Within these boundaries almost every type of scenery may be found. The rugged ridges and valleys of the Cumberland Plateau to the east and southeast make up about one-fourth of the state.

To the south and west stretches a succession of rolling hills, plateaus, and plains, ending in the flat lands along the Mississippi. In the center and north lies the famous Bluegrass area, a rolling plain, about 800 to 1,000 feet above sea level. This is land where even today, after nearly a century of cultivation without fer-

THE BORDER STATE BETWEEN NORTH AND SOUTH



With the Ohio River separating it from the busy industrial states of the north, and its southern boundary well within Dixie land, Kentucky shares more than any other state in the characteristics of both regions. On the one hand are manufacturing centers and on the other rich plantation districts, while the eastern third of the state runs into the Appalachian range with its characteristic mountain life.

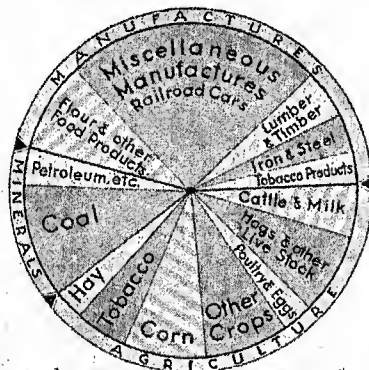
tilizers, a farmer gets two crops from a field in a season, or two cuttings of clover from a meadow, with rich grazing besides. While tobacco is the principal sale crop, the most valuable single crop is corn, which, like the other cereals, is used chiefly within the state. Wheat and hay, and, in the Ohio Valley region, vegetables and orchard fruits, are also important crops.

These exceptionally fertile lands—among the best in the world—comprise about 10,000 square miles, or nearly a quarter of the state's area. About two-thirds of the remainder, or 22,000 square miles, is good agricultural land, but susceptible of exhaustion. There are about 7,000 square miles of inferior lands—only an insignificant fraction is entirely useless so far as agriculture is concerned.

A land of milk and honey indeed! What wonder that it drew the white man over mountain and rough wilderness infested with Indians? The early settlers might have to toil early and late, what time they were not defending themselves against Indian raids; they might have to weave themselves garments out of hemp and nettle fiber and buffalo wool; their bedsteads might be poles laid on pronged sticks thrust in the dirt floors of their log cabins—but the fare served on their puncheon tables was abundant to the point of frontier luxury.

At various times, even while much of the state was still covered with virgin forest, Kentucky has stood first among the states in production of wheat, hemp, Indian corn, wool, and flax. For many years, until North Carolina stepped into first place, it was the leading tobacco-growing state, supplying nearly a third of the nation's entire crop.

PRODUCTS AND OCCUPATIONS



AGRICULTURE
MANUFACTURING
TRADE & TRANSPORTATION
MINING
OTHER OCCUPATIONS

and great fortunes were made in it before the Civil War. Hemp has long ceased to be the money-making crop of the state, and in recent years has been almost entirely replaced by other crops. Yet the name still has sentimental value. Kentucky writers dwell lovingly on the beauty of the plant, with its fernlike foliage and the delicious, pungent, balsamic fragrance of the brilliant green hemp fields (*see* Hemp).

The state's chief pride, however, is the famous Kentucky thoroughbred horse. A mild winter climate, splendid pasturage the year around, and abundant water, particularly in the Bluegrass region, marked the state as naturally adapted to stock raising. Shorthorn cattle were in the early times raised on the Kentucky plains and driven across the mountains to market in the tidewater country, and cattle

and sheep are still raised to a considerable extent. But Kentuckians were not satisfied with a product in which mere quantity counts most; something akin to an artistic desire for perfection found expression in the development of the finest road horses in the country. One of the few brief acts of the first legislative assembly held west of the Alleghenies had to do with the preservation of the breed of horses. The patient unwearying effort of a long line of intelligent breeders has produced a strain of thoroughbred saddle horses combining speed and endurance to an unusual degree. Three-fourths of the winners on the American turf, it is said, have been Kentucky horses; and the record on the trotting track has been no less notable.

Road building has progressed rapidly in Kentucky in recent years. There are more than a dozen state and federal highways, criss-crossed by many miles of hard surfaced inter-county-seat roads, stretching across the state.

Being blessed with social dispositions, in addition to fine horses and splendid roads, Kentuckians see no reason why country life should be either lonely or monotonous. Unmeasured hospitality on the lordly scale practiced before the Civil War is impossible now; but still Kentuckians at home are open-handed and open-hearted, and away from home to be a Kentuckian is to possess the grip and password that commands instant response from any other member of the "Bluegrass" fraternity. Most of the original settlers came from Virginia, North Carolina, Pennsylvania, and Maryland.

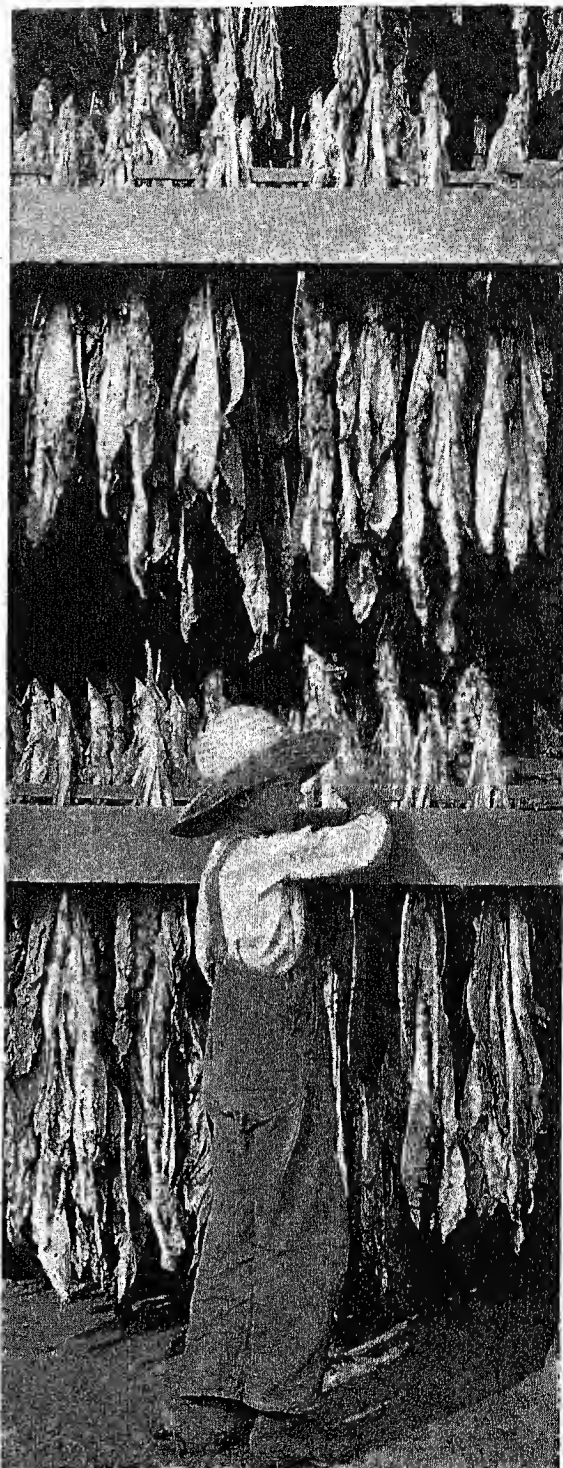
In addition to vast agricultural and stock-raising activities, Kentucky has hundreds of busy factories with an output valued in some years at half a billion dollars, giving employment to tens of thousands of workers. The principal manufactured products are railroad cars and equipment, iron and steel products, flour, tobacco in various forms, packed meats, lumber products, and machinery.

Louisville is the chief city and manufacturing center (see Louisville). Covington, which ranks second as a manufacturing city, is notable not only for the variety of its industries but also for its beautiful residential sections. Picturesquely located with wide rolling hills in the distance, it arouses the admiration of thousands of visitors who come yearly to the horse races at Latonia track.

Lexington, the home of Henry Clay, one of the great statesmen of the Civil War period (see Clay, Henry), is in the central part of the state where, on the rich "Bluegrass" lands, graze some of the finest live stock in the world. Many records have been established on its internationally famous race track. It is the home of the state university and other educational institutions.

What goes before applies chiefly or altogether to central and western Kentucky. The mountain belt in the east is another story, just as it is in most of the Southern states through which the Appalachians run. So long as the transmontane roads from lowland

CURING KENTUCKY TOBACCO



Tobacco growers use different methods for curing the leaves, depending upon the kind of leaf and purpose for which it is to be used. In the method known as the "Kentucky cure," the tobacco is hung in the barn, and a system of iron pipes carries a moderate degree of heat from outside fires for a period of several weeks.

Kentucky to the seaboard were in use, there was some communication between the mountains and the plains; but more and more, from 1830 on, as other routes came into use, the mountaineers were marooned, cut off from advancing civilization, and largely forgotten, except when distasteful reminders of their existence floated down in tales of feuds, moonshining, or lawless resistance to officers of the law in "bloody Breathitt" or some other mountain county. Lacking schools, records, roads, and money, the mountaineers have a

high percentage of illiteracy and few links with the past except their names (largely English and Scotch), their speech, in which linger many words obsolete elsewhere since Shakespeare's time, and customs and ballads of equally ancient origin. These hardy and virile mountaineers make up about a quarter of the state's population. For many years trachoma and hookworm were a serious menace to their vitality, but vigorous campaigns by national and local public health agencies have greatly reduced the prevalence of these diseases. Feuds and moonshining are going out of fashion, and education is eagerly welcomed, as the attendance and spirit at Berea College and other educational institutions for mountaineers testify. The "moonlight schools" (schools held on moonlight nights) are sometimes attended by whole families. Abraham Lincoln, it may be noted, was born in Kentucky of mountaineer stock.

Mineral Resources of Kentucky

Kentucky is one of the leading coal-producing states. Petroleum and natural gas are also found in many parts of the state, though production has fallen off considerably. Iron ore is found in the north-eastern part of the state, but is not extensively mined. Limestone underlies the whole state, and much of it is good for building; a good structural sandstone is also found. Clay and cement rock are also abundant. Near Louisville are extensive deposits of asphalt rock. Fluorspar and lead are also mined. About a third of the state is covered with marketable timber.

Two of the important natural features of the state are the extensive mileage of navigable water afforded

by the Ohio and its tributaries and by the Mississippi, and the number of caverns, such as Mammoth Cave.

As the scene of bitter wars among Shawnee, Cherokee, and Chickasaw Indians, this region was already known as the "dark and bloody ground" before the

arrival in 1609 of La Salle at the site of Louisville, where the rapids barred his progress down the Ohio. Land companies in the East as early as 1750 sent Thomas Walker through the Cumberland Gap, the gateway through the Appalachians, to explore the region; and they sent Christo-

pher Gist up the Ohio as far as the falls at Louisville.

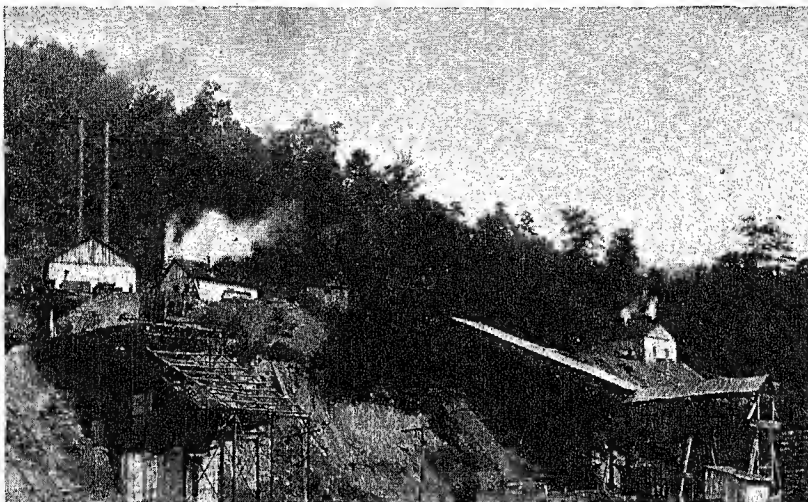
In 1769 several backwoodsmen from the Yadkin district in North Carolina led by Daniel Boone, came looking for land (see Boone, Daniel). They stayed so long that Kentuckians were henceforth called "Long Hunters." By 1774 several small settlements had been made. In 1775 Daniel Boone, who had returned home for his family, was commissioned by the Transylvania Company to lead a group of pioneers into this "second paradise." They blazed the famous "Wilderness Trail" from Cumberland Gap to Boonesborough.

The Long Effort to Win Statehood

Shortly thereafter, stations were established at Harrodsburg, Boiling Springs, and St. Asaph, or Logan's Station. Virginia, of which Kentucky was still a part according to the original charter grant of 1609, refused to recognize the land claims of Richard Henderson for the Transylvania Company and in 1776 organized Kentucky County. Unprotected from the numerous Indian attacks, the Kentucky settlers called a convention at Danville in 1784 and petitioned Congress to make them a state. While recognition was being debated, Indian attacks, supported by the British, continued until George Rogers Clark broke English influence in the northwest by forcing the surrender of Governor Hamilton at Vincennes, Ind., in 1779 (see Clark, George Rogers). Kentucky was admitted as a state on June 1, 1792.

The legislature, under the influence of John Breckinridge as spokesman of the New West, passed the Kentucky Resolutions written by Thomas Jefferson, in 1798-99 (see States' Rights). A little later Ken-

WHERE THE RUGGED HILLS YIELD COAL



This mine near Middlesboro is typical of those which supply the state's coal output. Kentucky possesses two coal fields, the eastern one in the Appalachian region and the western field being part of the formation which underlies Illinois and part of Indiana.

tucky's brilliant representative, Henry Clay, became the great compromiser between the free North and the slave South (see Clay, Henry; Compromise of 1850). When the Civil War threatened in 1860, John C. Breckenridge, John J. Crittenden, and Gov. Beriah Magoffin attempted to prevent it by compromise, and to hold the state neutral. Crittenden suggested a constitutional amendment prohibiting slavery north of 36° 30' and giving adequate protection to southern slave holders. The plan was called the Crittenden Compromise. Torn in interests, Kentucky sent 80,000 volunteers from her mountains to Lincoln, and 40,000 from her Blue Grass plantations to the Confederate army. Following the reconstruction period, the state entered a new era in the development of its abundant resources and varied industries.

In addition to the University of Kentucky at Lexington, there are a number of noteworthy educational institutions, which include the teachers colleges at Bowling Green, Richmond, Morehead, and Murray; Transylvania College (1780) at Lexington; Centre College (1819) at Danville; and Berea College (1855) at Berea. Blacks and whites attend separate public schools. Among the state parks are Cumberland Falls, Pioneer Memorial, and Blue Licks. There are two national parks, Abraham Lincoln, near Hodgenville, and Mammoth Cave (see Cave). **KEPLER, JOHANN** (1571-1630). The son of a brawling irresponsible German soldier of fortune, cradled in poverty and neglect, crippled from childhood in the hands so that nice manual dexterity with instruments was impossible to him, too dim-sighted to make keen observations, too delicate of constitution to bear long exposure to night air—surely never was a great astronomer so handicapped by nature and circumstance as Johann Kepler, who nevertheless was one of the greatest. He was educated at the Univer-

sity of Tübingen for the ministry, but with his appointment to the chair of mathematics and astronomy at Gratz (Austria) came the call to his life-work.

The German astronomers of that day were mostly

astrologists and fortune-telling charlatans, and Kepler was naturally reluctant to rank himself in such company. So having accepted astronomy as his career, he bent all his energies to extracting from observations of the stars some real knowledge of the universe. All that was yet known of planetary motion was what Copernicus had established—that the planets move, not around the earth, but about the sun (in circles, it was still supposed). Two other great men, the Italian Galileo and Tycho Brahe, a Dane, were seriously studying the heavens at this time. Kepler became acquainted with both of them through

correspondence, and in 1600 accepted an invitation to become Tycho Brahe's assistant in his observatory near Prague (Bohemia). Brahe's death the next year opened the way for Kepler's appointment to succeed him as mathematician and astronomer to the Emperor Rudolph II. He now devoted himself even more to discovery.

One theory after

another was tried and abandoned, until at last, "after incredible labor, through innumerable wrong guesses and after six years of almost incessant calculation," he hailed with wild delight the three laws which brought order out of the chaos of astronomy and prepared the ground for Newton's discovery of the law of gravitation. (See Astronomy.)

To the end of his life Kepler was dogged by misfortune—by war, which interrupted his work; by illness, and domestic calamity; by poverty, for his salary was always in arrears—nor was his position improved when, in 1628, he left the emperor's service to enter that of Wallenstein, the great general of the

OLD AND NEW CAPITOLS



The upper view shows the old State House at the head of St. Clair Street in Frankfort. The lower view shows the new capitol, completed in 1907 at a cost of over \$2,000,000. It is 400 feet long and the top of its dome is 205 feet above the terrace line. It houses the state library and the library of the Kentucky State Historical Society.

Thirty Year's War. Yet from the pursuit of truth he won a joy untouched by outward troubles. His wife asked him one night what he had been doing so long on the roof. "I have been thinking," said he, "the thoughts of God."

The laws of planetary motion which are still known as "Kepler's laws" may be stated as follows: (1) The path of every planet in its motion about the sun forms an ellipse, with the sun at one focus. (2) The speed of the planet in its orbit varies so that the line joining the center of the sun with the center of the planet sweeps over equal areas in equal times. (3) The time taken by any planet in its revolution about the sun has a definite relation to its distance from the sun, the "square" of its time being in exact proportion to the "cube" of its distance. These three laws give us the principle "by which the universe is balanced," and enable astronomers to tell the exact position of any planet at any time, past or present. Kepler arrived at his laws as the result of an enormous number of observations of the planets and endless labor of calculation. He set his laws down as facts of planetary motion without knowing *why* they were so. It remained for Newton, with his discovery of the law of gravitation, to supply the explanation and so complete Kepler's work.

KEY WEST, FLA. The Florida Keys are a chain of islands stretching a hundred miles southwestward from the coast of the Florida peninsula to Key West, the outermost island. Altogether there are about 10,000 of these keys (from Spanish *cayo*, meaning "reef"), most of them of coral formation. The larger ones are covered with tropical vegetation, but the others are only low reefs submerged at high tide.

At the end of the chain of islands is Key West, the southernmost city of the United States. Its strategic value as an outpost in defense of the Panama Canal became apparent in the World War of 1914-18. Hence its naval air station and the submarine base facilities of its deep harbor were revived under the national defense program that began in 1940.

Once a busy industrial center, the city met with a series of misfortunes. A thriving sponge-fishing industry destroyed itself by ruthlessly stripping the sponge beds without regard for future crops. After the first World War, the once numerous defense forces stationed here were withdrawn. Cigar factories, which employed thousands, were removed. The pineapple-canning industry too disappeared. In September 1935, a terrific hurricane destroyed great stretches of the famous railroad which linked Florida with Key West by viaducts connecting the islands.

Hard hit by its losses, the city appealed to the government for help. With state and federal aid, the citizens undertook a large program to make Key West a tourist center. The 170-mile Overseas Highway from Miami was completed in 1938. Most of this wide, hard-surfaced road runs over the old railroad bridges and viaducts. Deep-sea fishing and beautiful marine life are among the attractions en-

joyed by the thousands of visitors. With an average winter temperature of 70 degrees and with sunshine every day, the city is an ideal winter resort. Population (1940 census), 12,927.

KHARKOV (*kär'kôf*). Chief city of one of Russia's five major industrial regions, Kharkov stands in the eastern Ukraine, about 450 miles south of Moscow. The Cossacks built a fort here in 1654, during the war with Poland for the Ukraine, and gradually the city became a center of government in this region.

The rich coal fields of the Donets basin to the southeast and the vast iron deposits of Krivoi Rog to the southwest were developed during the latter part of the 19th century, and were responsible for the city's rapid growth and the building of great industrial plants. Situated in one of the world's most fertile agricultural regions, Kharkov made a specialty of manufacturing tractors and other farm machinery. The building of a dam and hydroelectric plants on the Dnieper River, at Zaporozhe, about 150 miles to the southwest, created another large industry—the manufacture of electrical equipment. Other industries included smelting and the manufacture of locomotives, coal products, and prepared foods.

Russia's main north-south railroad lines and air routes pass through Kharkov, and the city is a collecting and distributing point for the fruits, grains, oil, and other products from the Crimea and the Caucasus.

As the city grew in importance under the Soviet régime, new streets and squares were laid out and great office buildings were constructed. The House of State Industry, a striking example of modern architectural planning, was the largest office building in Europe at the time of its opening in 1928.

The university at Kharkov was founded in the early 19th century. Unrivalled collections of Ukrainian art were gathered together in the Museum of Ukrainian Art and the Museum of Ancient Ukraine. In 1923 the Kharkov fair was reopened to exhibit the agricultural and metallurgical industries of the Ukraine.

The first World War and the civil wars of 1917-20 interrupted Kharkov's growth, but after 1920 remarkable progress was made. During the second World War, the city was ravaged when the German armies captured it in their drive toward the Caucasus. In 1941 the dam at Zaporozhe was blown up to prevent the Germans from using the industrial plants dependent upon it. Population (1939 census), 835,000.

KIDD, CAPTAIN WILLIAM (1650?-1701). Numberless legends attached to the name of Captain Kidd have made him the most famous of pirates. Strangely enough, the charge of piracy was never definitely proved against him, and authorities now seriously doubt whether he was ever a pirate at all.

William Kidd was a Scottish minister's son, and followed the sea from his youth. In King William's War between the English and the French, he became known as the bold captain of a privateer in the West Indies. By the end of the 17th century he had become a successful shipmaster sailing from New

York. British commerce then suffered greatly from marauding pirates, so, at the request of the governor of New York, Kidd received two commissions from the king addressed to "our trusty and well-beloved Captain Kidd"—one for suppressing piracy and the other as a privateer against the French. With his 30 guns and his crew of 155 men, the captain jauntily set sail in his ship *Adventure* for Madagascar, Malabar, and the Red Sea region, the chief haunts of the pirates.

Then his troubles began. No pirates were found, a cholera plague destroyed some of the crew, the ship grew leaky, and supplies began to give out. Then, apparently, Captain Kidd was overruled by his mutinous crew, which seized his vessel and turned to piracy. They captured several small Moorish vessels, fought with a Portuguese man-of-war, and finally took the *Quedagh Merchant*, a rich Armenian prize.

Kidd's Arrest and Conviction

At this point, according to Kidd's later testimony, he regained his command, abandoned the old *Adventure*, transferred the captured booty to a sloop, and set sail for America, intending to turn over the loot to the colonial authorities. But he was arrested in Boston, where he landed, and sent to London for trial. There he was convicted of murder for killing a mutinous sailor. After a trial in which the evidence was inconclusive and he kept protesting that he was "the innocentest person of them all," he was pronounced guilty also of piracy. He was hanged at Execution Dock with several of his companions, and his body long hung in chains, a warning to all would-be robbers of the sea.

His fame was spread abroad by the popular ballad "My name is Captain Kidd, as I sailed, as I sailed," and many a romance, such as Stevenson's 'Treasure Island' has been inspired by stories of his adventures. From time to time people still search fruitlessly under the banks of the Hudson or on the shores of Long Island Sound for the hoard of gold and silver and precious stones said to have been buried by him.

KIDNEYS. Did you ever go through the filtration plant of a large city waterworks, where the supply comes from an impure source such as a river? There you see streams of impure water pumped in, mixed with chemicals, and finally passed through great beds of sand that stop the impurities but let the good clear water pass through to the pipes of the city.

The kidneys of the human body are the purifying and filtering plant for the blood. They gather up the wastes from the blood and throw them off through the bladder in the form of urine. They serve also to maintain the proper composition of the blood by eliminating not only waste products but also normal constituents, such as sugar, when these happen to be present in excess.

The kidneys are a pair of bean-shaped glands about $4\frac{1}{2}$ inches long, $2\frac{1}{2}$ inches wide, and $1\frac{1}{2}$ inches thick. One is situated on each side of the spinal column, directly under what is called the "small of the back." The right one is placed slightly lower than the left,

to make room for the liver. They are protected by a mass of fat. Each kidney is made up of a million or more tiny tubes. The cells which line these tubes do the work of collecting waste from the blood as it passes over them.

Ordinarily the kidneys throw off three to four pints of urine every day. Anything which interferes with the activity of these organs means the accumulation of poisonous waste matter in the body and immediately brings on serious sickness or even rapid death. It is this that makes diseases of the kidneys so serious. "Bright's Disease," for instance, is an inflammation of the kidneys which interferes with their normal activity and causes them to throw off albumin. Unless this condition is cured, the waste poison called *urea* accumulates in the blood with fatal results. Sometimes chalklike stones are formed in the kidneys and stop up the passages.

Almost all diseases have some effect on the kidneys. Hence one of the methods most relied upon by the physician in determining the general health of a patient and detecting unsuspected trouble is to make a chemical analysis of the urine.

KIEF (*ké'yéf*). One of the most fascinating cities in Russia is ancient Kief, tho capital of the Ukrainian Soviet Socialist Republic on the Dnieper River. The exact origin of the city is lost in legend, but certainly it is one of the oldest settlements in eastern Europe. Yet despite its ancient aspect, Kief is modern, too, with its busy wharves, smelting works, flour mills, sugar refineries, distilleries, and tobacco, leather, glass, nail, and other factories.

There are three distinct parts of Kief—the low-lying business section, called the Podol, which includes the large Jewish quarter; old Kief, crowning the highest of the many hills; and on Pechersky hill, the world-famous monastery, or Lavra, with its caves of cells, founded in the 11th century.

The Lavra, a place of pilgrimage before the Revolution, formerly was like a city in itself, with walls and towers, streets of cells, inns, churches, and its own printing press and schools. Some monks spent their entire lives in the cave cells; when one no longer took his food from the tiny opening in the wall, a funeral service was held for him, and the opening was sealed. Some of Russia's noted saints are buried in these caverns. The buildings today contain a historical museum, an art school, and other public institutions.

In old Kief is the lovely St. Sophia Cathedral, famous for its golden-topped bell tower and its 11th-century frescoes and mosaics. It is now an art museum.

Kief was founded before the 5th century, and in the Middle Ages was rich and famous. Late in the 10th century it was the capital of Grand Duke Vladimir, who was baptized a Christian and made Kief the home of the Greek church in Russia. The Mongols sacked it in 1240, and it remained in foreign hands until 1686, when it returned to Russia. The city was captured in 1941 by the Germans invading the Soviet Union. Population, about 845,000.

The STEP Between HOME and FIRST GRADE



Some of the children in this big kindergarten room, bright with sun and plants and pictures, are sitting comfortably on the floor to hear a story. The artists at the tables are too busy to listen, and so are the house planners at the left. Kindergarten may seem like play, but to the children it is a serious but nevertheless an enjoyable business.

KINDERGARTENS AND NURSERY SCHOOLS. When our great-grandfathers and great-grandmothers went to school they were expected to sit quietly on hard benches or seats and learn their A B C's before they did anything else. Reading, writing, and arithmetic took up most of their time, with spelling, geography, and history coming later. The teachers of those days would be horrified if they could visit one of our modern schools and see children moving freely about, occupied with wood-work, paper-construction, modeling in clay, and the like.

Why are our schools today so different from those of 60 or 70 years ago? Chiefly because Friedrich Froebel gave the world a new idea of the purpose of education. When Froebel founded the first kindergarten, he laid the basis of most of the changes which have come into the elementary schools. No longer do we think a person is educated when he has mastered a little "book-learning." The well-educated person is one who not only has knowledge or information, but also has the ability to do and enjoy many things, and to get along well with other people.

"A B C's" No Longer First

Much of this training can be started in early years. In fact, it is now possible in some cities for a child to go to school three or four years before he learns to read at all. During this time the child is learning to take care of himself, to use

his muscles easily and accurately, to eat what is best for his growing body, to play happily, to rest properly, and to work with other children and respect their rights. In the nursery school and the kindergarten he learns some of the fundamental habits and abilities that are essential for his well-being in later years.

The purpose of the kindergarten, as of all education, is to increase the general happiness of the multitudes by helping each individual to develop to the utmost

of his ability. How can this be done? First, by giving each child the best health possible. The kindergarten teachers watch for any indication of poor eyesight or hearing, poor posture, decayed teeth, and insufficient nourishment. By detecting defects early they may save the child years of ill health or backwardness in school. Sometimes a child appears stupid in school when the real trouble is that he is so near-sighted he cannot see the blackboard, or so deaf that he does not hear the teacher's questions.

Teaching Healthful Habits

The school tries also to encourage the child in habits which will keep his body healthy, teaching him, for example, to brush his teeth, to keep his hands out of his mouth, to wash them before

every meal, and to eat the proper foods. The kindergarten also helps the child to develop his muscles and to gain control over his body. It does not attempt to make every child an acrobat, but it does try to

NO KINDERGARTEN FOR HIM



This little chap in India begins his education by painfully learning his A B C's, just as our grandfathers had to do. He does not have the benefit of Kindergarten training.

PLAYING STORE MAKES COUNTING FUN



see that his movements are well coordinated and that he can control his muscles accurately.

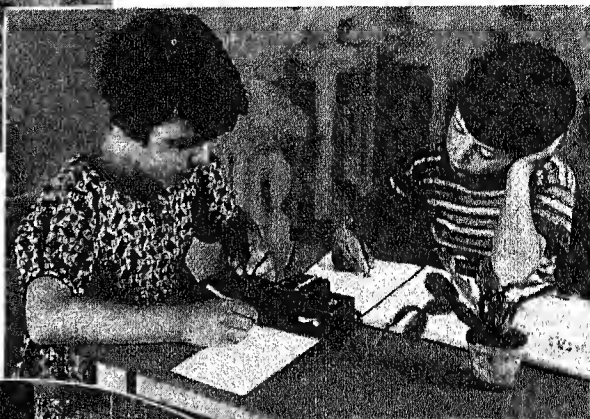
Very young children are not expected to sit still for more than a few minutes at a time, for we know that movement is natural for boys and girls. Many schools provide some piece of apparatus—a slide or climbing rope—in the room so that when a child is tired of sitting he can have a few moments of activity and come back to his task refreshed. The kindergarten child develops his larger muscles by running, jumping, and climbing; he acquires control over smaller muscles through practise in cutting, in drawing, in modeling with clay, in working with wood and tools, and in many other occupations. The kindergarten also aims to develop qualities of leadership, initiative, followership (or team work), perseverance, and respect for authority. Such development or education is brought about through physical activity, social play, construction, the use of tools, conversation, contacts with plant and animal life, and through music and stories.

"Play" that Instructs

In the kindergarten from 20 to 50 children work and play together for two or three hours a day. The teacher and her assistant plan the activities so that each child is constantly meeting situations that present problems. So far as possible he is left to solve them himself, though the teachers stand ready to ad-

vise, to give information, to praise, or to criticize. It is the aim of every teacher to help each child raise his standards of work and surpass previous achievements.

Since the kindergarten immediately precedes the first grade, the teacher prepares the child to meet the new problems he will find in his school work the next year. He learns to adjust himself to a group. Through measuring, weighing, and counting, he begins to have an understanding of number

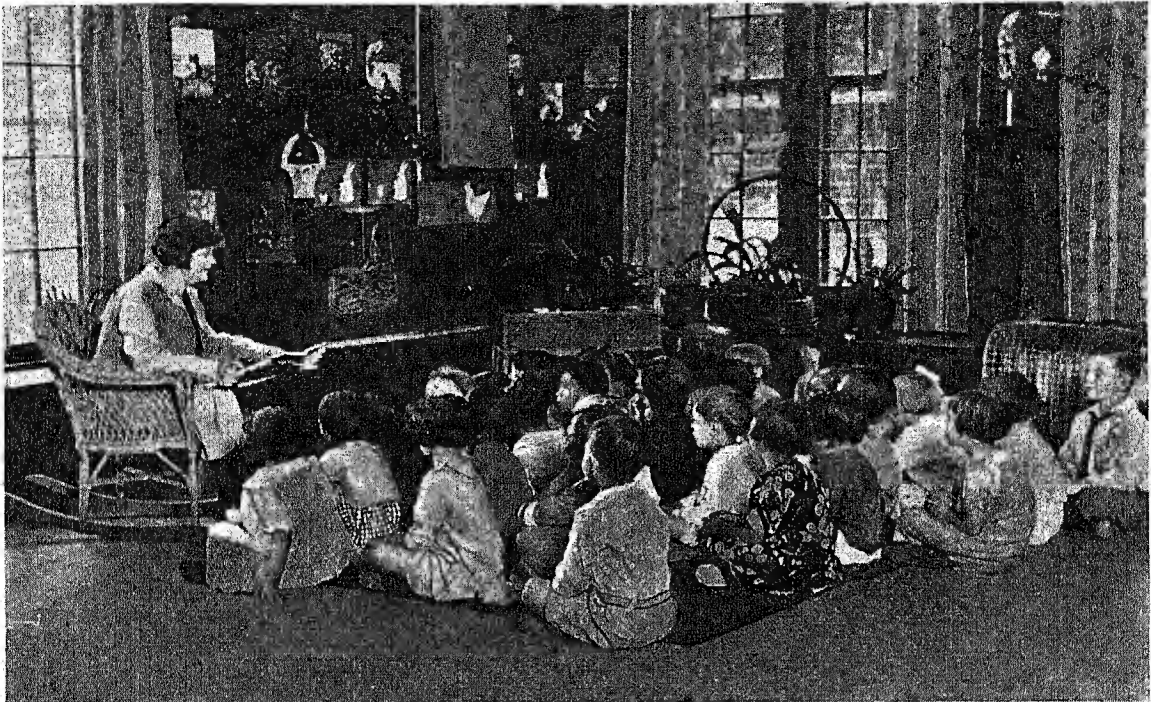


Busy shoppers and clerks in the make-believe grocery store, upper left, are sure to pick up the first principles of arithmetic as they earnestly count pennies and make change. The serious little girl above is absorbed in working a counting machine, while the boy studies a self-instruction book. One of the favorite games of the kindergarten is "Blind Man's Buff," in which the blindfolded child runs his hands over any playmate he catches and tries to guess his identity. That is not so easy to do in these days of identical sleek bobbed heads.



How can kitty pick up cream so neatly with her swift pink tongue? This mystery is being carefully studied by the fascinated little pair.

WHEN THE STORY HOUR COMES AROUND



A group of little tow-heads, red-heads, and curly-heads listen with never a wiggle to the adventures of Peter Rabbit. Tomorrow they will act out the story. It is around Easter time, and the Los Angeles kindergarten has been making pictures of bunnies and chickens. The best work is hung on the wall. Kindergartens tie up work with the seasons and with special events.

values, which will help him in his arithmetic. Through drawing, painting, stringing beads, manipulating pegs, and modeling in plastic clay he develops control over the small muscles which will be called into play in writing. Through conversation, stories, handling of books, learning to recognize signs and names, the child builds a foundation for the formal reading which is begun in the first grade. The kindergarten has a close connection not only with the first grade but also with the home, since many of its children are away from home for the first time. It is a link between home and first grade.

In no other country has the kindergarten had as free an opportunity to develop as in the United States, where it was brought between 1850 and 1860 by educated German immigrants. The first distinctly American kindergarten was opened in Boston in

1860 by Miss Elizabeth Peabody. Shortly thereafter kindergartens were established in New York, Chicago, Philadelphia, Milwaukee, Pittsburgh, St. Louis, Cincinnati, and Louisville. Such kindergartens were private institutions. It was necessary to enact special state legislation to permit the use of school funds for the establishment of kindergartens.

PINAFORES AND KIMONOS IN JAPAN



Japan leads all oriental countries in its acceptance of modern educational ideas as well as in other modern points of view. These little girls, with their kimonos covered by very occidental white aprons, are receiving much the same training as do American or European children.

of kindergarten age, must establish a kindergarten, to support which a tax shall be levied.

The Nursery School

With our new appreciation of the fact that the first five years of childhood set the character pattern

"BUSINESS HOURS" IN A NURSERY SCHOOL



What spick-and-span housekeepers the nursery school children in the top picture are! The small furniture is all dusted, the table is set, the doll beds are made. The three-year-olds in the picture directly above are learning to make men and animals from clay. They are the children of Harvard professors and Boston business men. In the picture at the left, it's time for afternoon naps in the day nursery in Hull House, Chicago.

for the rest of life has come a new feature in education—the nursery school, for children from about two to four years of age.

The movement for group training of children below kindergarten age began in England shortly before the World War. Under the guidance of Margaret and Rachel McMillan, nursery schools were established in the crowded slum districts of London for the purpose of improving the physical condition of children. In the United States the nursery school is concerned not only with the health of the children but also with their mental development and the formation of desirable habits. The chief aim is to provide the right kind of environment: furniture of the right size and

kind, toys and play materials, healthy playmates, and plenty of clean air, sunshine, and proper food. Much attention is given to problems of behavior, in which right conduct is inspired rather than forced.

Encouraging Initiative

"Free play," in which each child selects his own kind of activity, takes up the greater part of the day. Occasionally the children assemble in small groups for a brief period of music or language. Here they learn to enjoy tunes and to use them as helps to self expression, and here they are encouraged to tell experiences of their own. Rest periods give needed relaxation.

Many nursery schools have a secondary aim beyond the provision of a desirable environment. Some collect information on the abilities, memory, learning power, and habits of young children; some offer a chance for mothers and teachers to observe or assist in the han-

ding of young children; some care for children of working mothers; and others train young women as nursery school teachers.

The length of the nursery-school day varies with the school. In those schools which are conducted for the benefit of the working mother, the school may be open from 7 a.m. to 7 p.m. and may provide all three meals. Other schools may keep the children from 9 a.m. to 4 p.m. and provide the mid-day meal and an opportunity for a nap. Others run merely a half-day session and provide no meals, except a glass of orange or tomato juice in the middle of the session.

KINGBIRD. One of the most familiar American representatives of the tyrant flycatchers (*Tyrannus tyrannus*). It is about eight inches long, nearly black above and white underneath. The head is quite black, with a flame-colored crest surrounded by white and orange which can be erected at will. The kingbird catches insects on the wing, and is often called the bee-martin from the number of honeybees it eats. It is found throughout North America in the summer, but is rare west of the Rocky Mountains. Several related species in the western part of the United States are often called kingbirds. (See Flycatchers.)

KINGFISHER. The kingfisher is a trick performer, and by his tricks he gets his living. From a perch sometimes as high as 50 feet above the water he does a sudden dive, seizes some luckless little fish in his long beak, flies back to his perch, tosses the fish into the air, and swallows it head first! At times he beats the fish against the perch before swallowing it, or he may carry the fish away to his young family; but one part of the performance is always the same—the meteor-like swiftness of the bird's plunge.

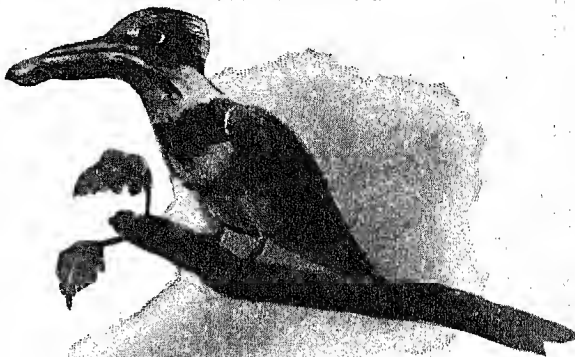
The kingfishers constitute a large family of about 200 species, distributed over the greater part of the globe, with about 11 species in America. All are remarkable for the beauty of their plumage and their interesting habits (for illustration in colors see Birds). They are unsociable birds, and when a pair has taken out "fishing rights" for a particular neighborhood, it allows no trespassing there by others.

The true kingfishers nest in holes which they dig in banks, from 4 to 15 feet deep. The five to eight eggs are laid on a heap of fish bones, and the young grow up in quite a fishy atmosphere.

The belted kingfisher is the commonest American species. It is about 12 inches long, with a bristling black crest which gives it a savage look; its upper feathers and belt are bluish gray, and under parts

white. The females have a reddish band across the abdomen. The large bill is a powerful sharp-edged implement that is capable of catching an insect on land, or a slippery fish under water. The call is a loud rattling cry unlike the call of any other bird. This species winters in most of the central and southern parts of the United States. The Texas kingfisher is a smaller bird, green above and white below. He resembles the belted kingfisher in habits.

HOME FROM HER FISHING

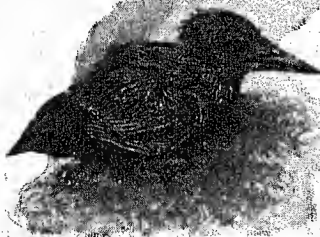


The kingfisher family is most numerous in the Malay Archipelago and New Guinea, where there are many beautifully colored species. The common kingfisher of Europe, with its blue-green upper parts and rich chestnut breast, is an example of the striking plumage some members of this family wear.

Many beautiful legends are connected with the European kingfisher, or *halcyon*, as it was anciently called. An old belief was that the seven days preceding the shortest day of the year were used by these birds to build their nests, which, it was thought, floated on the water, and the seven days following were devoted to hatching the eggs. During this period, "the halcyon days," the ancients believed, the sea was always calm. That is why we use the word "halcyon" to describe calm peaceful days. The power of quelling storms was believed to have been conferred upon the kingfisher by Aeolus, the wind-god, who made this dispensation when his daughter, Alcyone, and her husband, Ceyx, were changed into kingfishers. This myth accounts for the ancient and poetical name of *halcyon*.

The scientific name of the kingfisher family is *Alcedinidae* and they belong to the order *Coraciiformes*. Scientific name of belted kingfisher, *Megasceryle alcyon*.

Mrs. Kingfisher has just arrived with a dainty fish for dinner. Apparently the youngster below doesn't know yet that refreshments have arrived, for he doesn't seem a bit interested.



KING GEORGE'S WAR. The third of the series of wars fought in the American colonies as part of the conflicts which shook Europe in the 18th century took place during the reign of King George II of England. In the European war Prussia, France, and Spain were lined up against Austria and England in the War of the Austrian Succession (1740-48), a struggle for balance of power, commerce, and colonial possessions (see Maria Theresa).

In the colonial war, which was fought from Canada to the Caribbean, the English had to fight both the French and the Spanish. English expeditions against Cartagena, great Spanish stronghold on the South American coast, and St. Augustine, Fla., came to nothing, as did a retaliatory Spanish expedition against Georgia.

The principal event of the war was the capture in 1745 of the French fortress of Louisbourg on Cape Breton Island by an English fleet and an army of New England colonials led by William Pepperell. From this stronghold, built to protect the southern entrance to the Gulf of St. Lawrence, the French had hoped to recapture Acadia to the south, which they had lost in Queen Anne's War. In the Peace of Aix-la-Chapelle (1748), Louisbourg was restored to the French, and the war ended indecisively. But the so-called peace was a mere truce before the final struggle in which the French lost New France to their English foes (see French and Indian War).

'KING LEAR.' By many judges this master tragedy of Shakespeare is ranked as the finest piece of dramatic literature in the world. Lear, a headstrong old sovereign of ancient Britain, divides his realm into three parts, and then calls on his three daughters each to receive her share according to the love she professes for him. Goneril and Regan, ill-reared and deceitful women that they are, so insult reason with their extravagant avowals that the youngest daughter, simple honest Cordelia, becomes disgusted with them and states her own dutiful love too modestly to please the proud old king. He casts her off penniless, so that she would have been poor indeed had not the pitying King of France straightway claimed her as his bride and queen. Having thus foolishly bestowed his kingdom, Lear learns—

How sharper than a serpent's tooth it is
To have a thankless child!

Shorn of every kingly dignity, denied by his elder daughters even the respect due to a father, the old man rushes out into the tempestuous night, lest his brain burst with its insupportable storm of rage and grief. In the pauses of the tempest, we hear his terrible curses, his piteous prayers, his mad mutterings, and the bitter pointed chatter of his faithful fool.

One gleam of peace breaks upon his sin and suffering. This is when Cordelia and poor sick Lear are

reunited, with the avenging armies of France about them. But their armies are defeated and Lear is next seen bearing the dead body of Cordelia from prison, where her cruel sister has caused her to be hanged. The guilty daughters perish and their party is overthrown, but Lear dies of a broken heart. Describing Cordelia, Lear says:

Her voice was ever soft,
Gentle, and low,—an excellent thing in woman.
And it is Lear again, weighing his deserts in the storm, who says:

I am a man
More sinned against than sinning.
Gone quite insane with suffering, he replies to the question "Is it not the King?" with the proud remark:
Ay, every inch a King!

KINGLETS. With the humming-birds, kinglets are the midgets of the bird world. Though they are not shy, it is difficult to observe these tiny birds, for they are always on the move, and their plumage—olive-green above and yellowish-gray beneath—makes them inconspicuous among the leaves of the trees. The male birds have a distinguishing bright spot of orange or vermillion on the top of the head. In the ruby-crowned kinglet this spot is concealed or displayed at will (for illustration in color, see Birds). In the golden-crowned it is always visible.

The kinglet's lovely song is all out of proportion to the size of the bird, but its call-note is thin. Kinglets nest in evergreen forests of the far north and are seen throughout the United States in the fall, winter, and early spring. Their appetite for insects makes them of great value to the farmer.

With the equally tiny gnatcatchers, kinglets form the family *Sylviidae*. The blue-gray gnatcatcher of the eastern states, and the western gnatcatcher are very similar, the upper parts bluish-gray, under parts white, forehead black, tail black with white outer feathers. Scientific name of golden-crowned kinglet, *Regulus satrapa*; of ruby-crowned, *Corthylio calendula*; of the gnatcatchers, *Poliophtila caerulea*.

KING PHILIP'S WAR. The attempt of several tribes of Algonquian Indians, led by the Wampanoags, to stand against the tide of white settlement in New England led to one of the most tragic of all wars between the colonists and the Red Men. In 1662 Metacomet, or Philip, younger son of the Pilgrims' friend Massasoit, succeeded his father as chief sachem of the Wampanoags. He tried for some years to keep peace and meet the demands of the white settlers, who were increasing in numbers and encroaching more and more on the Indians' lands. But the English suspected Philip of secretly plotting against them and forced the Wampanoags to surrender their arms (1671). Whether or not their suspicions were justified is a disputed point. At any rate, an Indian who was acting as informer to the colonists was murdered in 1675 and three Wampanoags were executed for the crime.

This act precipitated a bloody war which involved



The Ruby-crowned Kinglet is one of the tiniest of birds.

the Nipmucs and Narragansetts, as well as the Wampanoags. Up and down the Connecticut valley in Massachusetts and in the colonies of Plymouth and Rhode Island the war raged. The Indians raided and burned settlements and slew men, women, and children, and the colonists resorted to like measures against their foes. Gradually the colonists cleared the country of Indians. Philip himself was hunted down in a swamp in Rhode Island and killed Aug. 12, 1676. At his death the war in southern New England was over, but in New Hampshire and Maine, Saco Indians continued to raid defenseless settlements for a year and a half longer.

KINGSLEY, CHARLES (1819–1875). Known chiefly in his own day as a radical writer and clergyman, Charles Kingsley was far more versatile than those who knew him only as a reformer would have believed. This spare, hawklike parson was also novelist, naturalist, professor, and poet.

The son of a clergyman, Kingsley was born June 12, 1819, in Devonshire. He attended King's College in London after his father had obtained a rectory in that city. Later he entered Cambridge University, from which he was graduated with honors. In 1842 he went as curate to the parish of Eversley, in Hampshire, and soon was appointed rector, a position which he held for the rest of his life. He died Jan. 23, 1875, and was buried in his own churchyard at Eversley.

Deeply interested in social and economic problems, Kingsley risked his position in the church by his speeches and writings in behalf of the laboring classes. He associated himself with the Christian Socialists, a group which proposed radical solutions for the problems of a restless England. 'Yeast' (1849) and 'Alton Locke' (1849) are two of his novels dealing with social problems.

Though Kingsley's years (1860–69) as a professor of modern history at Cambridge were unremarkable, he wrote several novels on historical subjects for which he is chiefly remembered. 'Westward Ho!' (1855) tells the story of a famous Devonshire knight making history in the stirring days of Elizabeth. 'Hypatia' (1853) deals with the former glories of Alexandria, in Egypt. 'Hereward the Wake' (1866) is a tale of Saxon England about the time of William the Conqueror.

For his children Kingsley wrote delightful nature stories which have become the property of children everywhere. Among them are 'Madam How and Lady Why' (1869) and 'Water-Babies' (1863). The latter is a fairy story and nature story combined. Its hero, a little chimney sweep, is changed by the fairies into a water-baby, and he learns about the habits of the water creatures and birds. Among his amazing adventures is that on "the Isle of Tomtoddis, all heads and no bodies"—a warning against too many lessons!

KINGSTON, ONTARIO. The port of Kingston is situated at the east end of Lake Ontario, where the lake pours its waters into the St. Lawrence River, and at the southern outlet of the Rideau Canal. Today it is chiefly an educational, residential, and summer

resort city, although for many years it was the most important city of Upper Canada (Ontario). It still has a considerable trade, chiefly in the transshipment of grain. The harbor, sheltered by Wolfe and Simcoe islands, is one of the best on Lake Ontario.

Kingston is the seat of the Royal Military College and of Queen's University, one of Canada's foremost educational institutions. Its industries include the manufacture of locomotives, textiles, steam engines, boats, cigars, and chemicals. Near by are large feldspar and mica mines.

On the spot where Kingston now stands Frontenac, the French governor of Canada, in 1673 built a fort which was known by his name for more than a hundred years. Fort Frontenac remained one of the chief French centers of trade and government until it fell into the hands of the British in 1758. During the American Revolution United Empire Loyalists from the American Colonies settled there and changed the name to Kingston, in honor of King George III. For four years (1841–45) it was the capital of Canada. Population, 23,439.

KING WILLIAM'S WAR. From 1689 until the Battle of Waterloo in 1815 the French and the British with various allies fought a series of wars on land and sea in a struggle for power on the European continent. Several of these wars were fought in America as well, for there too the French and English were rivals—each determined to expand its territories, enlarge its trading area, and claim and hold as many strategic points as possible. The American wars finally resulted in the conquest of New France by the British.

The first of these European wars began after William of Orange, already the chief enemy of Louis XIV of France, was given the English throne. It was fought chiefly to check the attempt of Louis XIV to push his boundaries east to the Rhine. In European history it is known as the War of the Grand Alliance, or the War of the League of Augsburg, because Spain and the Austrian Empire joined William in the conflict (see William III; James II).

The American phase of the struggle is called King William's War. Both the French and English were helped by their Indian allies. The French resorted to Indian methods of warfare, making raids along the frontiers of New York and New Hampshire and against the settlements of Maine and slaughtering the inhabitants of villages. The English planned expeditions against Montreal and Quebec. Another force captured Port Royal, Nova Scotia, but a sea expedition led by Sir William Phips against Quebec was defeated by Frontenac, the French governor (see Frontenac), and Iberville in command of French ships took Newfoundland and Hudson's Bay.

The Peace of Ryswyck, signed in 1697, which terminated both the American and the European struggles, restored all territorial gains in the colonies. But peace was of short duration, for five years later, Queen Anne's War (1702–13) broke out as part of the War of the Spanish Succession in Europe.

KIPLING, PRINCE of STORY-TELLERS

KIPLING, RUDYARD (1865-1936). On Dec. 29, 1865, when Victoria was queen in England and the United States had just come to the end of its Civil War, a boy was born in Bombay who was to win fame as "the spokesman for the Anglo-Saxon breed."

From both his parents Rudyard Kipling inherited the tradition and the standards that have made England great among the nations. His father, John Lockwood Kipling, was an English artist who for a time headed a school of art in Bombay and later became curator of the School of Art and Museum in Lahore. Kipling's mother, Alice Macdonald, was the daughter of a Wesleyan clergyman, one of four sisters who all married well-known men. One became the wife of Sir Edward Burne-Jones, another of Sir Edward Poynter, president of the Royal Academy, and the third sister, Louisa, married Albert Baldwin and was the mother of a prime minister of Great Britain, Stanley Baldwin.

Early Life in India and England

The first five years of Rudyard's life were spent in India. Much of the vividness, the realism of the 'Jungle Books' is probably due to the impressions that came to him, before he could talk, of the strange primitive country that lay beyond the cities and the highways of British India. He and his little sister had a native nurse, and her tales of the jungle animals lingered in his memory to crystallize later in Mowgli and Shere Khan and the gray wolves. Like most English children in foreign lands, he was sent to England at five to be educated. Too young for boarding school, he was left in the care of a woman who seems to have been the worst possible guardian for a sensitive boy accustomed to sympathy and understanding. Nearly everything that a small boy wanted to do was to her a "sin." As a punishment, even reading was forbidden, and Kipling almost ruined his eyes by devouring in secret every book he could lay his hands on. Those six years in that "House of Desolation," in which—he says rather sadly—"there was so little love and so much Bible," are described in a story called 'Baa Baa Black Sheep'.

At last his parents came home from India on leave, and they remade his world. Glasses helped his weak eyes, and he was carried off to a summer in Devonshire with his father and mother and his lively young cousins. Later in the year his father took him to the Paris Exposition—a trip that, as he says, "was an education

in itself, and set my life-long love for France." The companionship of the father whom he always adored, the endless adventure of the Paris streets, and the excitement of seeing through the artist eyes of his father the treasures of the museums and the beauty of the French countryside—these filled his mind to overflowing and brought back to him health and confidence and security.

He Goes to Boarding School

At the end of this holiday he was sent to the United Services College, a famous school for sons of English army officers at Westward Hol, in Devonshire. His years there are recorded in 'Stalky and Co.'. Kipling himself was "Beetle." "How we, the originals of Stalky, McTurk and Beetle, came together I do not know," he says. "But our triple alliance was well established before we were thirteen." His first poems, published privately by his father, were written here.

The healthy, disciplined life of the school brought him strength and fitness; the attitude of some of the teachers brought mental freedom. And in him developed that passionate faith in England and in his race that was voiced in

his writing over and over again. As the French critic André Chevrillon later said, "Kipling's patriotism was the passion that shaped his life . . . an ever-present, restless passion—an active passion which has set him apart, consecrated him and marked him with a sign."

His Return to India—Newspaper Work

When he was just short of 17, far more mature than most boys of his age, he returned to his family in Lahore, wearing proudly a small mustache which his mother promptly ordered him to remove. He became a reporter on the one daily newspaper in the Punjab, the *Civil and Military Gazette*. In his autobiography Kipling calls this interval "Seven Years' Hard." Ten hours a day, six days in the week, he worked—prowling through the streets and market places, stopping in at the Punjab Club for bits of gossip, taking adventurous trips through the native states sometimes at the risk of his life, writing at all times and in all places. To get material for his newspaper articles, he traveled around India and came to know the country as did few others. In those years, says Stephen Vincent Benét, he was "a young man, with all the arrogance, the cocksureness and the great desires of youth upon him, and before he was twenty-five he had seen an astonishing amount of naked life and death."

KIPLING AS A YOUNG MAN



This photograph shows the great story-teller and poet when he was about 30 years old, with much of his best work already done. He was "a small, spare, brown man" with shaggy eyebrows and mustache, and a humorous gleam in the weak but keen brown eyes behind the thick-lensed glasses.

It was now that Kipling began to write the poems and short stories about the British soldier in India that were to establish his reputation as a writer. 'Plain Tales from the Hills', 'Soldiers Three', and 'Barrack Room Ballads' are known now wherever English is spoken. The slim little volume called 'Departmental Ditties' he edited, printed, published, and sold himself. From these books emerged the British soldier, Tommy Atkins. Sir George Younghusband said once: "R.K. made the modern soldier. Other writers have gone on with the good work, and they have between them manufactured the cheery, devil-may-care, lovable person enshrined in our hearts as Thomas Atkins."

In 1887 Kipling was transferred to a larger and more important newspaper at Allahabad, the *Pioneer*. Here he had more time for creative writing, and he made the most of it. In 1890, eager to find a publisher for his tales and conscious that he had earned a vacation, he set sail for England, going by way of Japan, China, and North America. He stopped in New York long enough to offer his stories to a publisher; but they were rejected and he went on to England. Again he faced "hard times." His effort to make a living as a writer is reflected in 'The Light That Failed'. He did find a publisher and a certain amount of recognition; but it was several years before the man in the street discovered him. At length the vital, dramatic stories and the singing verse fired the public imagination. The books sold rapidly and his words became a part of the common speech in both England and America.

He Marries an American

Two years later, his reputation firmly established, he married an American girl, Caroline Balestier, and started off with her on a trip around the world. Her brother, Wolcott Balestier, was a writer too, and a great friend of Kipling's. Together they wrote 'The Naulahka.' Then Balestier died. Among the many elegies that English poets have written, Kipling's elegy for Wolcott Balestier stands high. Its rhythmic lines haunt the memory long after it is read:

He scarce had need to doff his pride or slough the
dross of Earth—
E'en as he trod that day to God so walked he from
his birth,
In simpleness and gentleness and honour and
clean mirth.

After their honeymoon Kipling and his wife settled down in Vermont, in a little house on the outskirts of Brattleboro. In this house their first child was born, and there Kipling wrote the tales that were to make up his 'Jungle Books.' His father visited them and made the famous drawings that were published first,

"TIGER! TIGER!"



"Once started, there was no chance of stopping." Mowgli, on the back of the great herd bull Rama, leads the buffalo charge against Shere Khan, the tiger. Illustration by Kurt Wiese from 'All the Mowgli Stories'. (Doubleday.)

with the stories, in *St. Nicholas*. Soon after the birth of their daughter, the Kiplings built a larger house not far away, which they called Naulahka. The family physician, Dr. Conland, had once served with the Gloucester fishing fleet, and he persuaded Kipling to go to Gloucester for the annual memorial service for the men who had been lost or drowned during the year. The two men listened, fascinated, to the stories of life on the Grand Banks, and Kipling went home to write 'Captains Courageous'.

After four years in America, the Kiplings decided that their real home was in England. They rented a little house in a Sussex village near his uncle, Edward Burne-Jones, and his cousin Stanley Baldwin. There in August 1897, their only son, John, was born.

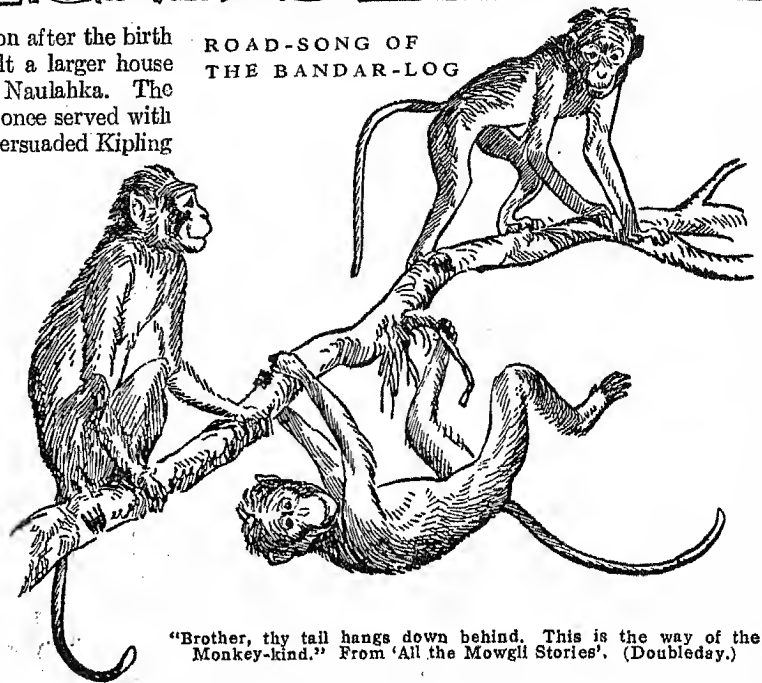
The Writing of 'Kim'

The story that we know as 'Kim' had been in Kipling's mind for years. Now, stimulated by his father's keen interest, he began to write it. Lockwood Kipling worked on the low-relief plaques which were photographed to make its illustrations. Their happy partnership lasted for months, and Kipling says of the writing: "The only trouble was to keep Kim within bounds."

Long visits to South Africa, where they formed a friendship with Cecil Rhodes, and another trip through North America varied the Sussex life. Early in 1902 Kipling and his wife found "the house of their dreams." It was an old house when he bought it, very old in parts. It stood on the edge of the Sussex Downs. All about it was land that had been cultivated since before the Norman Conquest, with deep meadows and splendid trees. It was called, and is called today, Bateman's. Dredging in a pond, Kipling found a Stone Age axhead and two Elizabethan "sealed quarts." "Just beyond the west fringe of our land," he wrote, "in a little valley running from Nowhere to Nothing-at-all, stood the long overgrown slag heap of a most ancient forge, supposed to have been worked by the Phoenicians and Romans."

One day his cousin, Ambrose Poynter, said to him: "Write a yarn about Roman times here." So 'Puck of Pook's Hill' and 'Rewards and Fairies' were begun. Volumes of history cannot give the vital impression that these stories give of England's past. Puck—the only fairy left in England, old and wise and kind—brings to life one by one the men and women who tell their own tales. Each story is complete in itself. Together they form a chain of "scents and sights and sounds" that reach to the very heart of England. Reading them, we see the flash of sunlight on iron as the Flint-Worker lifts his knife to defy the wolves, we hear the Roman centurions chatting in their

ROAD-SONG OF THE BANDAR-LOG



"Brother, thy tail hangs down behind. This is the way of the Monkey-kind." From 'All the Mowgli Stories'. (Doubleday.)

camp behind the Roman Wall, we smell the potatoes roasting in Old Hobden's fire, we understand why King John signed the Magna Charta, why the Norman Conquest so affected the Anglo-Saxon race. Kipling says that his "Daemon" wrote these stories, that some power outside himself dictated them. With 'Dymchurch Flit,' he says, "I was always unashamedly content."

Rewards and Sorrows

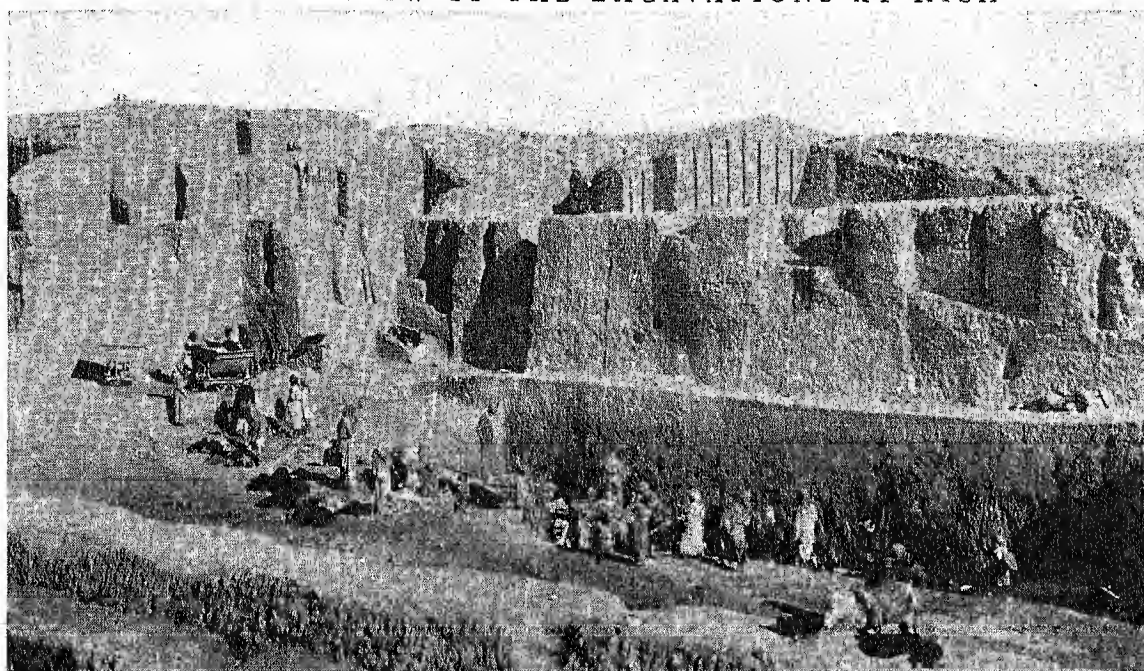
In 1907 he was awarded the Nobel Prize for literature and he and his wife went to Stockholm to receive it from the Swedish king. The Great War brought him personal tragedy. His only son was killed fighting in France with the Irish Guards. In John's memory Kipling wrote a history of this famous regiment, and the dedicatory poem has a refrain that is like a song once heard and never quite forgotten:

Old Days! The wild geese are fighting!
Head to the storm as they faced it before!
For where there are Irish there's bound to be fighting,
And when there's no fighting it's Ireland no more!
Ireland no more!

With the social and political changes that followed the war Rudyard Kipling had little sympathy. More and more he withdrew from the active scene, spending the greater part of the year in his Sussex farmhouse. When he was nearly 70 years old, he sat down to write his autobiography, 'Something of Myself.' It was published after his death. This is a curiously revealing book. In it we may see the background and the events that made Rudyard Kipling, the writer. And in it we may see, perhaps more than he himself intended, the prejudices and the convictions that made Rudyard Kipling, the man.

Kipling died Jan. 18, 1936, in the same month that brought the death of England's king, George V. He

GENERAL VIEW OF THE EXCAVATIONS AT KISH



The Temple of Nabonidus may be seen at the upper right, identified by the row of dark vertical lines. It was begun by Nebuchadnezzar and continued by Nabonidus about 550 B.C. Kish was abandoned before the temple was completed. The band of dark earth beside which the laborers are excavating is the flood stratum, deposited by the Euphrates River over the entire city and destroying it about 3200 B.C. This is taken as evidence of the great flood described by the Bible. (*Field Museum of Natural History Photo.*)

was buried in Westminster Abbey with England's honored sons. Perhaps his best epitaph is expressed in the lines he wrote for Wolcott Balestier—lines that might be said of all the men who lie beside him:

They are purged of pride because they died; they know
the worth of their bays;

They sit at wine with the Maidens Nine and the Gods
of the Elder Days—

It is their will to serve or be still as fitteth Our
Father's praise.

Books By and About Kipling

Kipling's principal works are: 'Plain Tales from the Hills' (1887); 'Soldiers Three', 'Story of the Gadsbys', 'Wee Willie Winkie' (1888-89); 'The Light That Failed' (1891); 'Barack Room Ballads' (1892); 'The Jungle Book' (1894); 'The Second Jungle Book' (1895); 'Captains Courageous' (1897); 'Stalky and Co.' (1899); 'Kim' (1901); 'Just So Stories' (1902); 'Puck of Pook's Hill' (1906); 'Rewards and Fairies' (1910); 'Songs from Books' (1913); 'The Years Between' (1918); 'Inclusive Verse' (1919); 'The Irish Guards in the Great War' (1923). The best book about Kipling is his own autobiography, 'Something of Myself' (1936). Others that the student of Kipling should know are: 'Rudyard Kipling', by C. Falls; 'Kipling's India', by A. Rumson; 'The Kipling Country' and 'Rudyard Kipling's World', by R. T. Hopkins.

KISH. The once majestic city of Kish is today only a mound of desolate ruins, on the Mesopotamian plain it ruled some 5,000 years ago. It lies between the Tigris and Euphrates rivers, about 8 miles east of the ruins of Babylon and 100 miles south of Baghdad, capital of Iraq. Inscriptions found in the ruins state that it was "the first city founded after the Flood." As the traditional first capital of the Sumerians, Kish was one of the early great centers of civiliza-

tion (see *Babylonia and Assyria*). While much of the world was still in a state of barbarism, the people of Kish were building palaces and temples of sun-dried brick, transacting business by written documents, and developing arts and sciences.

In ancient times, the plain was fertile, watered by the Euphrates. The Sumerians settled along a bend of the river, and built a fortified city, more than five miles long and almost two miles wide. Until as late as the time of Sargon (about 2750 B.C.), Kish dominated the Near East. Then it declined, for the Euphrates changed its course. Kish lost its power to Babylon, built on the new course. Finally it was abandoned and drifting desert sand covered its ruins.

Excavations by the Field Museum-Oxford University expedition, 1923-33, shed new light on the history of mankind. Digging to virgin soil, 60 feet below the top of the mound, the expedition found remains of several cultures, from Neolithic times to the Christian era. A band of alluvial soil, about 40 feet below the surface, indicated that Kish had been flooded about 3200 B.C. Many take this to be evidence of the great Biblical Flood. Equally astounding was the discovery, below the flood stratum, of a four-wheeled chariot. This is the earliest known wheeled vehicle (for picture, see *Transportation*). Other discoveries showing the highly developed civilization of the Sumerians were thick-walled ziggurats (temple towers), canals, and a library containing some of the earliest known writing.

KITCHENER OF KHARTUM, EARL (1850-1916). One of England's military heroes was Horatio Herbert Kitchener, a builder of the British Empire, and the organizing genius of England's army in the early years of the World War. He came of a military family, and was educated at the Royal Military Academy at Woolwich. He fought in the French army against Germany in 1871. Next, he made British army surveys in Palestine and Cyprus. In 1882 he became a cavalry officer in Egypt, and gradually rose to the command of the Anglo-Egyptian army. At the battle of Omdurman in 1898, he crushed England's rivals, the Mahdists, and then captured Khartum to avenge the death of Gordon (see Gordon, Gen. Charles George). This feat won Kitchener a place in the British peerage with the title Baron Kitchener of Khartum—or "K of K," as he was popularly called.

During the Boer War (1899-1902), he served in South Africa, first as chief of staff and finally as commander-in-chief. His system of transportation, wire barricades, and blockhouses put a swift end to the guerilla warfare of the Boers. In the next 12 years, he strengthened the empire as commander-in-chief in India, as inspector of the empire's forces, and as consul-general in Egypt, where his success earned him the title of earl.

At the start of the World War, he was made England's Secretary of State for War. He soon built the British expeditionary force from a mere 160,000 men into a mighty fighting unit of 70 divisions.

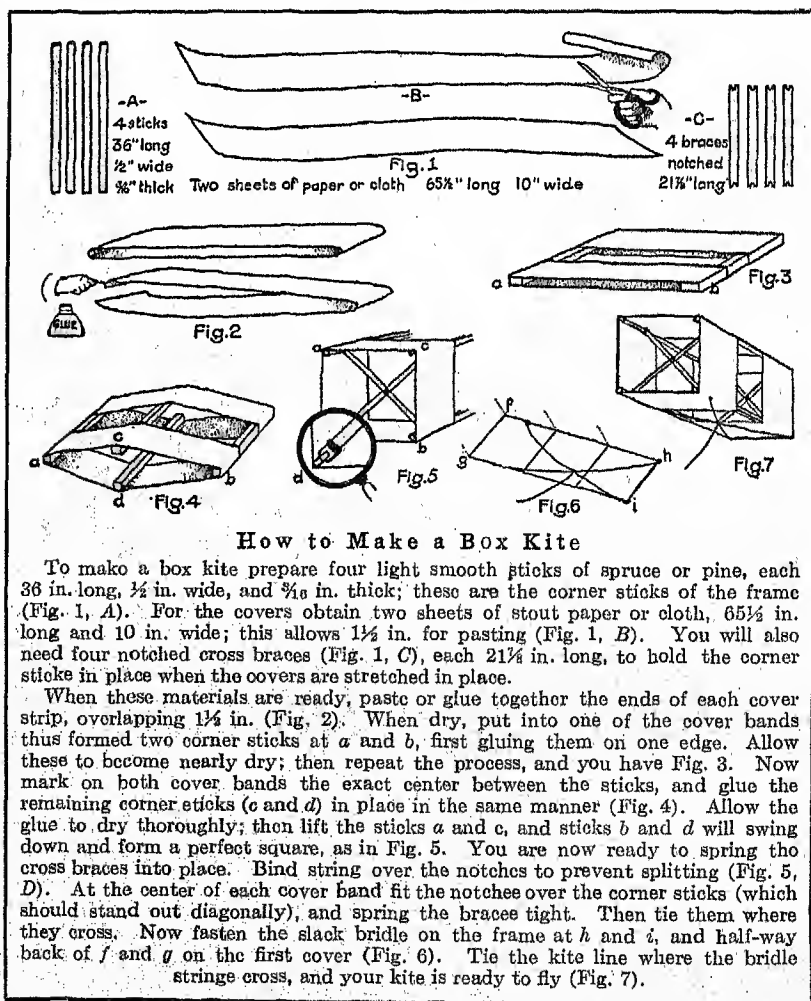
En route to Russia in 1916, he met death when his ship struck a mine near the Orkneys.

KITE. A bird of prey belonging to the same family (*Accipitridae*) as the eagles and the hawks. There are four species of kites in the United States, varying in length from 14 to 24 inches. The swallow-tailed kite, the largest of the group, has a white head and underparts, and black upper parts. The white-tailed kite, 17 inches in length, has light bluish-ash upperparts and white underparts and tail. The Everglade kite, which measures 18 inches, and the small Mississippi kite have bluish-gray plumage. They are all remarkable for their gracefulness of flight and power of gliding in the air. (See Hawk.)

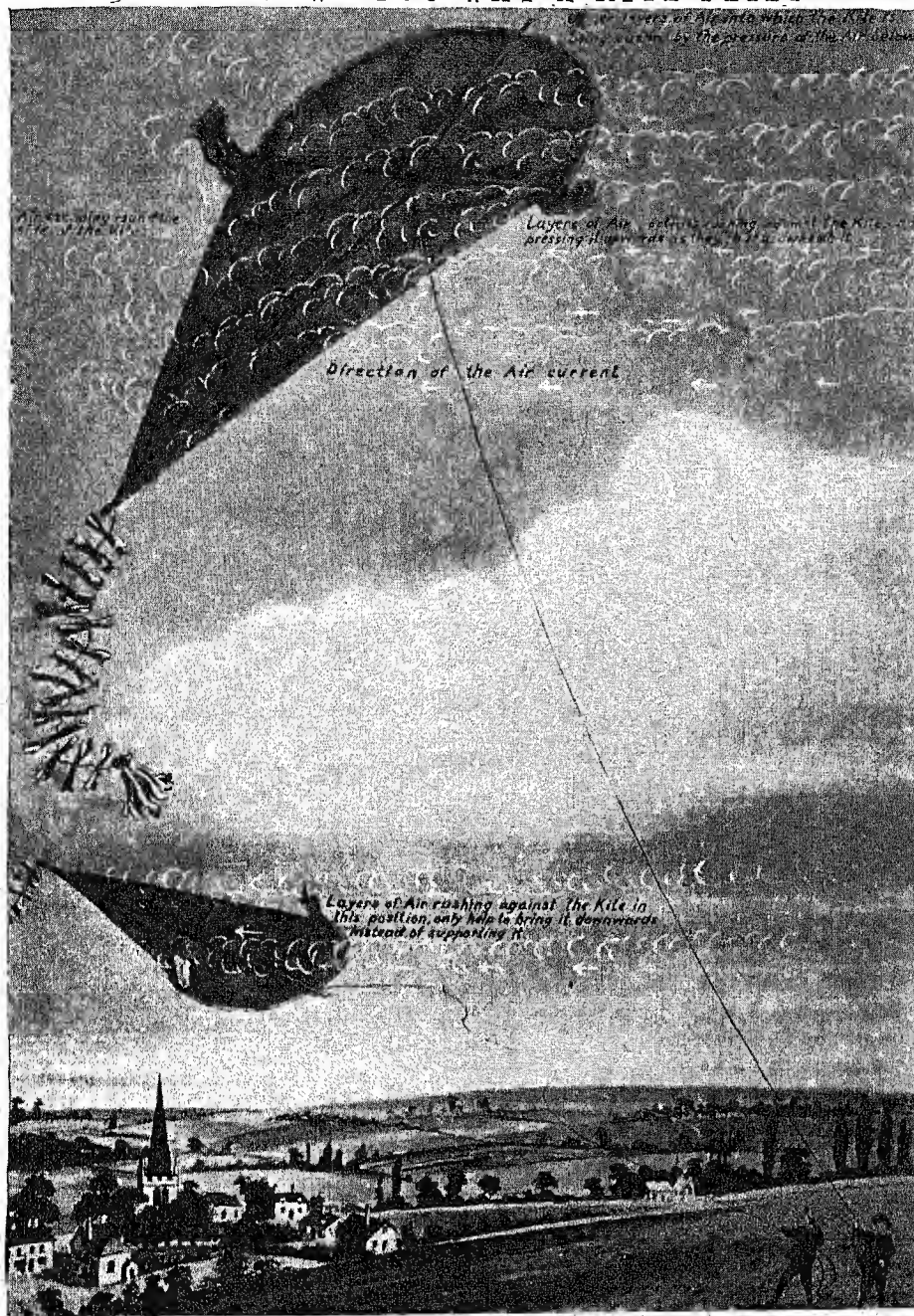
KITES. For years the daily weather forecasts were based upon reports from professional kite flyers at the government weather bureaus, but the airplane and balloon have now replaced the kite (see Weather Bureau). Great box kites carrying instruments for recording conditions in the upper air were sent up from one to three miles high. To reach a height much over a mile several kites were used, attached at long intervals to the same steel wire. A train of ten kites with $8\frac{1}{2}$ miles of wire has raised instruments to a height of more than four miles.

This was only one of many practical uses of the kite. Long before Benjamin Franklin with his famous kite and key drew electricity from a storm cloud, kites had been used for mechanical purposes. Ancient Korean and Chinese stories tell how kite strings carried cables over streams and chasms and so made passage for armies.

Even today kites are used in a similar way. Some of the greatest suspension bridges have begun from lines carried across a river by kites. Many a life, too, has been saved by kites which carried life lines



THIS SHOWS YOU WHY A KITE FLIES



The important thing in kite flying is that the strings hold the kite against the air in a diagonal position. Then the rush of air against it acts like a wedge, tending to push the kite upward and backward. The string keeps the kite from going back, so it rises.

to stranded ships. Kite photography has been used for military purposes, to obtain pictures of the enemy's defenses and position. The camera was fastened to the kite frame and the shutter was operated by electric wire, clockwork, and other devices. Man-lifting military kites were once used to a limited extent for observation and signaling, but they proved neither prac-

covered with glue and bits of glass, so that a player who has maneuvered his kite to windward of his opponent's can cut the cord of the other kite with a sudden jerk.

In some cities of the United States kite tournaments are held as part of school athletic contests. Prizes are awarded for points such as strength of

ticable nor safe, and have been superseded by the airplane and the balloon. A train of from three to six box kites from nine to twelve feet high was used. The observer was fastened to a swing just below the lowest kite.

The Sport of Kite-Flying

In Eastern countries kite-flying is an ancient custom and popular pastime. What horse-racing is to England, and baseball is to the United States, kite-flying is to Korea, Japan, and China. Korean men, women, and children, from the king downward, fly kites during the first days of the new year, and in China "Kites' Day"—the ninth day of the ninth month, is a great holiday. In China and Japan this favorite toy is made to represent gorgeously colored birds, insects, or flowers, as well as in many highly decorated geometrical forms. In some parts of the East kite-fighting is a favorite sport. The strings near the point where the kite is attached are

pull, high flight, artistic effect, feature flight, and distance flight dash. In the latter, kites fastened to measured string are flown to the end of the line, and drawn back to goal.

Kites are of two general classes, the plain surface and the box kite. Each has many varieties, and there are also combination kites using both the plain and box construction. Compound kites may have their several kites on one string, or on individual lines connected to a main line. Tailless kites are the most popular, though a large, flat-surface kite requires a balance that may be best given by a tail. The box kite is a square frame made of four sticks, one at each corner; and four braces, two near each end of the kite placed diagonally across the inside from one corner stick to the other. The covering is either of paper or cloth.

The flying of a kite depends upon the same principle as the sailing of a boat or the soaring of an airplane. In the case of the airplane, the wind is "created" by the speed with which the machine drives itself through the air. In the same way a kite can be flown on a perfectly calm day if it be towed from a bicycle or an automobile moving at a smart pace.

The principle is this: The current of air, moving horizontally, strikes the face of the kite, tending to drive it backward. If the kite were free it would be whirled away and would fall of its own weight. But the string holds it, so that the force of the

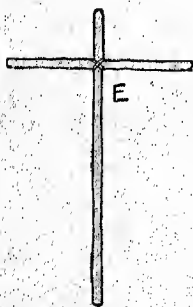


Fig. 1

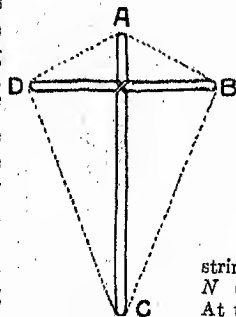


Fig. 2

string from X to Y and another from M to N (Fig. 4). These form the kite bridle. At their crossing point the kite line should be fastened. Now your kite is ready for flight. If it dives and sways, it needs a tail made of twine with bits of paper or rags tied several inches apart (Fig. 5). The length of the tail must be adjusted to the weight of the kite and can be determined by experiment.

wind, caught upon the *inclined surface* of the kite, thrusts it upward, much as a wedge thrusts up an object under which it is driven. In addition to this thrust from below, the rush of the wind around the sides of the kite creates a partial vacuum on the upper side. This tends to "suck" the kite upward. The same phenomenon on a greater scale takes place in the flight of an airplane (see Airplane).

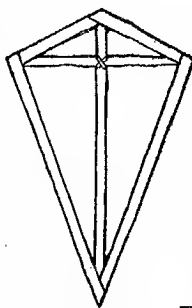


Fig. 3

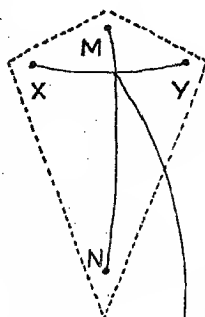


Fig. 4

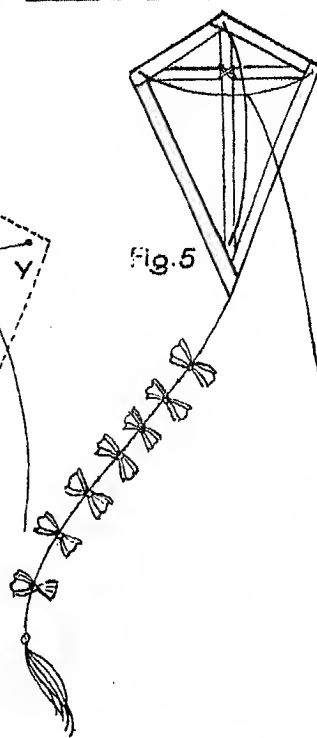


Fig. 5

How to Make Plain Kites

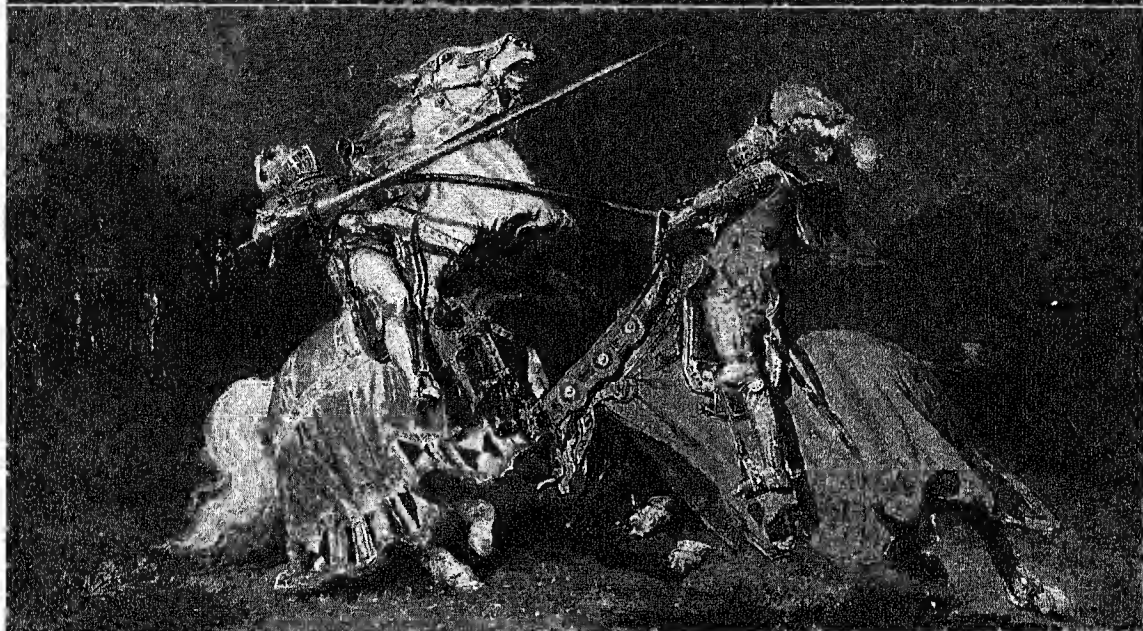
The simplest kite to make is the plain surface kite over a two-stick frame, as shown in the diagram. Such kites may be from one foot to thirty inches high. The frame is made of two sticks of soft tough wood, a shorter crossing a longer vertical one above its center (Fig. 1). At the crossing point, E, the sticks should be fastened with small brads, or lashed with a light-weight string. A strong twine tied at point A is stretched around the frame, passing through notches or slits at B, C, D, and fastened again at point A (Fig. 2). Cover the frame with light strong paper or cloth, pasting or sewing it over the string edges (Fig. 3). This cover, which should be cut an inch larger than the frame, must not be stretched too tight. Next, fasten a slack

KLONDIKE. A gold-mining district in Yukon Territory, Canada, lying chiefly to the east of the Yukon River. It was the scene of the great gold rush of 1897, when a barren waste was suddenly transformed into a busy mining region. As the rich placer deposits became exhausted the population greatly declined. The Klondike River, which gives its name to the region, is a small tributary of the Yukon. The

principal town of the region is Dawson, with a population of only 817 in the 1931 census.

Modern mines now seek the underground deposits, and the pack trails of older days are supplemented by a railway from Skagway to White Horse, at the headwaters of the Yukon. Mean temperatures in the Klondike region range from -20° F. in December to 60° F. in July. (See Yukon Territory.)

"In Days of Old, WHEN KNIGHTS WERE BOLD"



KNIGHTHOOD. A knight in armor would present a very strange appearance on a modern battlefield. His prancing steed and coat of mail, the heavy iron helmet which covered his head, the shield which he carried on his left arm, his lance and shining sword—all these belong to bygone days and have little place amid the storms of shot and shell and labyrinths of sunken trenches and barbed wire entanglements of modern warfare. Knighthood flourished before the time of guns and gunpowder, when battles still were won by hand-to-hand conflicts of heavy-armored knights. Fighting was almost an every-day occurrence, and the common people generally could not protect themselves against an invading foe. In times of danger they fled to the castles or strongholds owned by the nobles. To obtain protection the poorer folk became the serfs or villeins of their powerful neighbors, and those in turn were the vassals of those still more powerful; and closely connected with this feudal system, as it was called, we find the institution of knighthood.

The education of a knight began at the age of seven, when he was taken from his home and sent

to the castle of some famous nobleman, perhaps his father's lord. Here until he was 14 he served the lord and lady as a page. It was his duty, and he esteemed it a privilege, to accompany them at all times. He waited on them at table and went with them to the chase. He received religious instruction from the chaplain, training in arms from the squires, and was taught by his mistress and her ladies to honor and protect all women. He also learned to sing and to play the lute, to hunt and to hawk. But above all else he learned to ride a horse.

At the age of 14, he became a squire. He now learned to handle sword and lance, and to bear the weight of the heavy armor. In addition to other duties, he had now to carve at table and to accompany his knight to war. He assisted him in putting on the heavy armor. He saw to it that the knightly sword and other arms were polished until they shone. He stood by to give aid in conflict should his lord be overmatched; to lend his horse should the master lose his own. It was the squire who raised his knight when he fell, and who bore his body away if wounded or killed in battle.

In the Prologue to the 'Canterbury Tales', there is this beautiful description of a squire: "His clothes were embroidered red and white, as it were a meadow of fresh flowers. All the day he was singing or playing upon a lute, he was as fresh as the Month of May. His coat was short, with long wide sleeves. Well could he sit a horse and ride, make songs, joust and dance, draw and write. He loved so ardently that at nighttime he slept no more than a nightingale. He was courteous, modest, and helpful, and carved before his master at table."

At the age of 21, if as page and squire he had well acquitted himself, the young man was made a knight. This was an occasion of elaborate ceremony and solemn vows. After a bath of purification, the candidate for knighthood knelt or stood all night in prayer before the altar on which lay the precious armor which he would don on the morrow. In the morning there was a religious ceremony, with perhaps a sermon on the knight's duty to protect the weak, to right wrongs, and to honor women. Then in the courtyard in the presence of the assembled knights and fair ladies, a knight's armor was buckled on, piece by piece, a sword was girded about his waist, and spurs were attached to the candidate's feet. He then knelt to receive the accolade. This was a blow upon the neck or shoulder, given by the officiating lord or knight with his fist or with the flat of a sword. As he gave it he said, "In the name of God and St. Michael and St. George, I dub thee knight; be brave and loyal." The ceremony was followed by exhibitions of the young knight's skill in arms.

Sometimes on the occasion of a knighting, the lord at whose castle the ceremony took place gave a tournament. This was often a very gorgeous and extravagant entertainment. Knights for miles around were invited to come and take part, while many persons of distinction came to see the events. Sometimes the visitors came in such numbers that the lodgings of the castle were filled and tents were put

up for the later arrivals. The shield with its coat of arms served as a sort of doorplate to the passersby, who when they saw a familiar device displayed, would say, "Sir Percival is within this tent."

EQUIPPING THE YOUNG KNIGHT FOR ADVENTURE



What a proud moment it must have been for the family of a young squire when the time came for him to put on the honored armor of a knight! This picture shows a "try-on," with the armorer fitting the metal "garments" with the aid of hammer and pincers. In a few days the squire will be "knighted" with elaborate ceremonies.

In the morning, after attending mass, the knights would go to the tourney field or lists. Here the combats or jousts between the knights were fought. Sometimes two knights fought alone, sometimes whole companies met in combat. When all were assembled, the heralds announced the names of the contestants, and the new knight looked upon the most brilliant scene that the times had to offer. Along the sides of the field were handsome pavilions filled with beautiful ladies, gay young pages, and jewel-bedecked nobles. The knights were resplendent in shining armor, with swords like silver and golden spurs giving back the sunlight. Banners fluttered everywhere and here and there gleamed gorgeous cloth of gold.

The combats which took place in this gay setting were not gentle ones. The points of the weapons, to be sure, were usually encased in blocks of wood to make the encounter less harmful, but the sport was so rough and the knights jousted in such earnest that many were wounded and occasionally were killed. About each knight's helmet was tied the favor his lady had given him, and he fought to do her honor quite as much as to do himself credit. The joust was attended by much excitement, with the blowing of trumpets, the clash of steel, the shouts of heralds,



Painting by George Frederick Watts

See text on following page

SIR GALAHAD, THE PERFECT KNIGHT

SIR GALAHAD, THE PERFECT KNIGHT

SIR GALAHAD, the fearless and clean of heart, who rode forth in quest of the Holy Grail, has been celebrated in literature and art as the perfection of knighthood and chivalry. In this nobly imaginative painting by the distinguished English artist, George Frederick Watts, we see the Galahad of the poet Tennyson's dreams—clad in shining armor and bathed in the radiance of the ideal that was ever before his eyes.

Chivalry was the code of the knight. It commanded him to be fearless, to be loyal to his feudal lord, to obey and defend the Church, to reverence womanhood, to protect the weak, to feed and clothe the poor, to fight to the death for justice, and always to be true to his promised word.

These high ideals stand out among the noblest achievements of the Middle Ages. Though not all the knights were "true knights"—any more than all the gentlemen of today are "true gentlemen"—chivalry had a powerful influence on the life of the Middle Ages and did much to shape modern life. Western Europe, as it emerged from barbarism, was rough and savage. Warfare was unbelievably brutal, the warriors almost like savages in their ferocity. Women were little more than pieces of property. The poor suffered without help, like animals. Honor and loyalty were held lightly in daily life.

Chivalry, with its high ideals of conduct, did a great deal to temper that barbarian brutality. The knightly rule of mercy spared many a fallen foe in battle; the knightly rule of gentleness raised women of the noble class from their mean position as chattels; the knightly rule of charity bestowed alms on the poor; and devotion to justice sent forth many a knight to avenge wrongdoing.

Chivalry, as practiced by the true knight, helped to guide western Europe along the road of civilization; and its spirit still colors the ideals of honor, faith, mercy, and justice that we cherish today.

and the applause of the spectators; and it continued until one or the other of the knights was overcome. The defeated knight then yielded his horse and armor to his adversary and was assisted from the field by the squires.

Sometimes a tournament lasted for several days, feasting, dancing, and hawking filling the hours not given to fighting. Hawking was a sport indulged in by the ladies and the squires as well as by the knights; and almost every lady had her own hawk or falcon which when unhooded was trained to rise into the air and attack game birds (*see Hawk*).

Often during the festivities of a tournament a large pie was baked and live birds concealed inside. Then in the great hall the pie was opened, the birds flew about, and the falcons were loosed at them. This was considered great sport, and has been immortalized in the nursery rhyme—

Sing a song of sixpence, pocket full of rye,
Four and twenty blackbirds baked in a pie;
When the pie was opened, the birds began to sing;
Wasn't that a dainty dish to set before a king?

Into the Great World of Adventure!

After the festivities attending the conferring of knighthood, the young knight was free to go where he pleased. Usually he rode forth in quest of adventure, armor on his back, his spurs on his heels, and with sword, shield, and lance ready to hand. As a knight-errant he sought a fair maiden in need of a champion, or a strange knight with whom to joust. Sometimes he stationed himself at a bridge or crossroad to challenge to combat any knight who happened by. He was usually sure of hospitality at any castle to which he came. After a time he might return to his father's castle or join the following of some great lord, or become one of the multitude of crusaders who journeyed to rescue the Holy Sepulcher. Whenever or however he went he took with him the three watchwords of a knight: Religion, Honor, Courtesy. The ideal knight is thus described by the poet Chaucer: "And though he was valorous, he was prudent and as meek as a maid of his bearing. In all his life he never yet spake discourteously but was truly a perfect gentle knight." But only too often, alas! knights were false to those high ideals.

With the rise of the longbow and the crossbow carrying wounds or death from a distance, and the invention of gunpowder and cannon rendering useless the frowning feudal castle, the knight in armor passed out of existence. Knighthood then came to be merely a title of honor conferred for valuable service rendered to the king or state, with the title "Sir" as its only distinction. In recent times in England, it has been conferred on eminent scholars, lawyers, physicians, artists, and civil officers, as well as on soldiers. The United Kingdom has eight of these honorary orders of Knighthood—the Garter, the Thistle, St. Patrick, the Bath, Star of India, St. Michael and St. George, Indian Empire, and the Royal Victorian Order. (*See Armor; Castle; Feudalism.*)

KNIGHTS OF COLUMBUS. This great Roman Catholic fraternal organization was founded in New Haven, Conn., in 1882 by a Catholic priest, Michael J. McGivney. Its purpose is to provide insurance for its members, to assist those who are sick and disabled, and to promote education. The association now has a branch in every state, in every Canadian province, and in Newfoundland, Cuba, Puerto Rico, the Philippines, and the Canal Zone. The total membership is about half a million. It is governed by a supreme council, elected by the various state councils. During the World War of 1914-1918 it contributed notably to welfare work among the soldiers at home and overseas. It has since aided employment and contributed to relief funds.

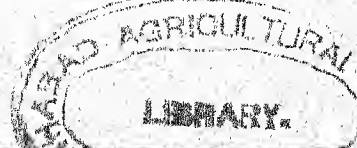
KNITTING MACHINES. Like other old handicrafts, knitting has become an important machine industry. But the World War of 1914-1918 revived the art of hand knitting. Women and girls everywhere knit sweaters, dresses, socks, and scarves. And so "knit a row and purl back" is again a familiar phrase (purling being merely knitting inverted). It is fascinating to watch a knitted fabric grow as deft fingers thrust needles of steel or bone into loops of yarn, catching the yarn to form new loops and transferring the rows from one needle to another.

In western Europe the art is apparently much newer than weaving, since the earliest allusions to knitting date from early in the 15th century. Some two hundred years later, Rev. William Lee of Nottinghamshire, England, watched knitting needles flying, building up a garment very slowly for all their flashing speed. He believed he could make a machine which would do the work much more quickly, and in 1589 he developed the first knitting machine, the "stocking frame." Instead of two or three needles, it had as many needles as there were loops, so arranged that they formed and gave off the loops alternately.

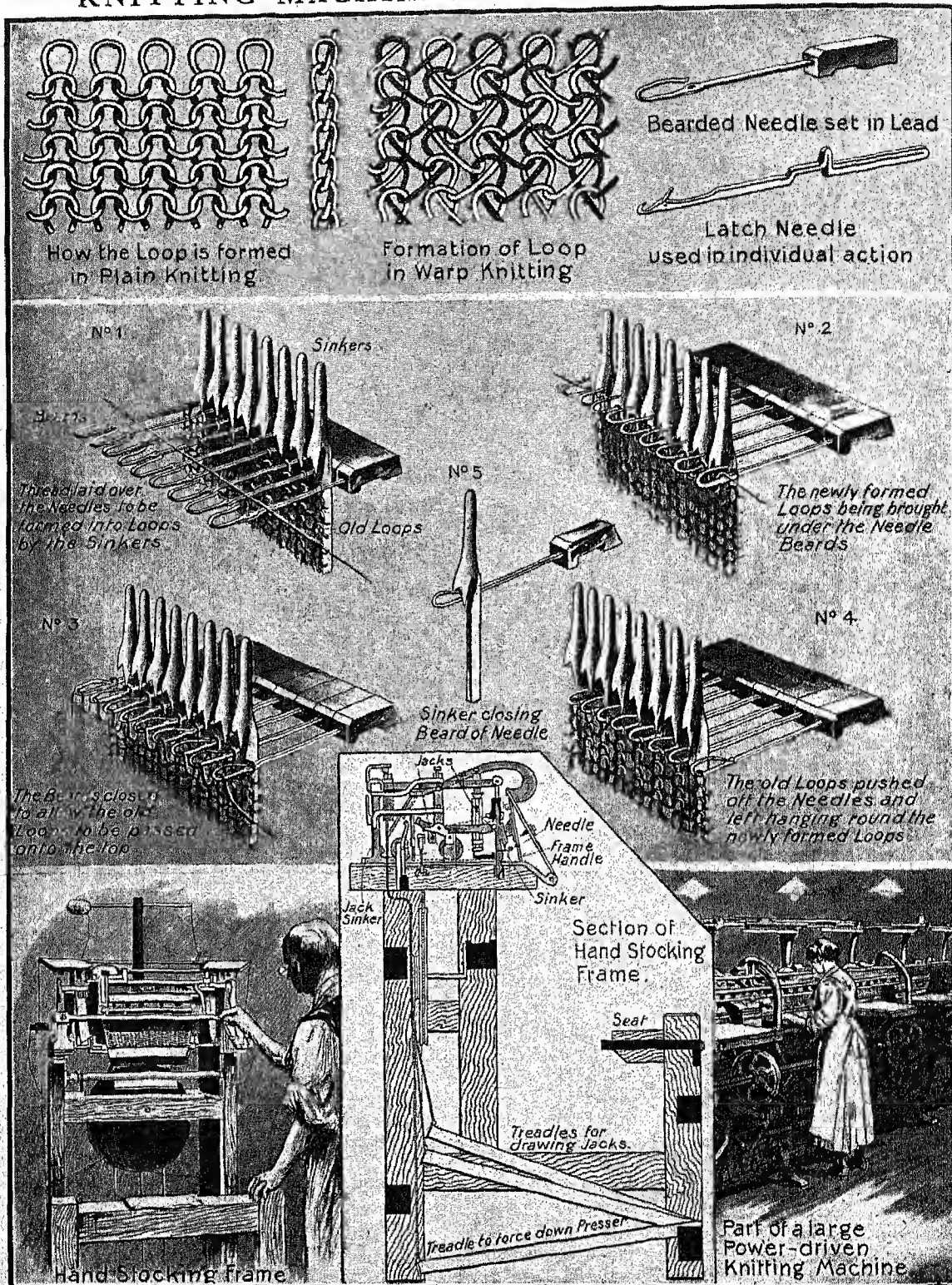
Queen Elizabeth's Silk Stockings

The inventor made a pair of stockings for Queen Elizabeth, but she was disappointed because they were of coarse worsted and not of silk. So Lee made another machine, which had 20 needles to the inch instead of 8, and with this he knitted a pair of silk stockings for the Queen. Although she was pleased with them, Elizabeth did not give the inventor a patent, for she feared the machine would throw hand knitters out of work.

Lee therefore took his machine to France; but its use spread in England and from it came the complicated knitting machinery of today, which produces hosiery, underwear, sweaters, mittens, and numerous other garments, as well as many beautiful fabrics, such as silk jersey. The modern machines are so complex that even looms which weave the most intricate patterns cannot be compared with them. Sometimes as many as five sets of machines are required to make a single garment, and if we examine any knitted garment we will see that oftentimes the work must be supplemented with sewing machines.



KNITTING MACHINES AND HOW THEY WORK



The top pictures show different styles of knitting and two kinds of needles used in the work. The four middle pictures show "framework knitting" with one continuous thread: 1. The thread lies across the needles ready for the next row. 2. The sinkers come forward and dip to loop the thread, at the same time closing the beards of the needles, as shown (5) in the center. 3. The sinkers rise again and push the old loops off the needles. 4. The row is completed. The pictures at the bottom show the old hand frames and an early power-driven machine.

The old machines knitted their webs flat, and stockings required to be sewed up at the back. Circular knitting machines were first produced in 1816. They are now used more than any other because of their greater speed and capacity. Set close around the circular frames are hundreds of little needles which seem to rise one after another, apparently of their own accord. They catch the yarn, pull it down through another loop which is just slipping off their peculiarly shaped heads. The head of this needle, after the first loop is safely off, opens and holds the new loop until the next one comes down through it to take its place.

"Framework" and "Warp Knit" Fabrics

Machine-knitted fabrics are of two kinds, known as "framework knit" and "warp knit." In the first, one continuous thread is looped over and over, the loops supporting themselves, just as in hand knitting. Warp knitting is made by interlooping parallel threads, as many threads being used as there are loops in the width of the fabric. The former is used in making hosiery, underwear, sweaters, etc. The latter, because it gives greater scope for reproducing designs and color, is used in shawl-making, glove-making, and fancy hosiery.

It is not difficult to distinguish between the two. If a thread of framework knitting is broken the whole fabric can be unraveled by pulling it. If, instead, a broken thread unravels a line straight down its length—as when a "run" develops in your best stocking—the material is warp knit.

Modern Developments in Knitting

The modern knitting machines are power-driven and entirely automatic. The needles, which slide in grooves, and are raised and lowered by little V-shaped cams which move around the machine beneath them, are dropped or added as the material is to be narrowed or widened. Fancy ribbed effects in the tops of sports hose, etc., are made with a Jacquard attachment. (See *Spinning and Weaving*.) Some of these wonderful machines are capable of making more than 600,000 loops a minute, and their action is so nearly automatic that one person can look after several machines at once. Knitting by hand, a person working steadily can turn out one stocking a day, but a modern stocking machine will turn out a hundred pairs in the same length of time.

Knit goods differ from woven goods in that the latter are made up of two complete sets of threads intersecting at right angles, while a knitted fabric is made up by looping one continuous thread or interlooping a series of parallel threads. Because they are elastic and porous, knitted materials are especially well suited for stockings and underwear.

KNIVES AND FORKS. "Fingers were made before forks, and hands before knives" is an old saying. Table knives do not seem to have come into general use in Europe until late in the Middle Ages, and in England the use of forks at table was laughed at as a new-fangled curiosity as late as 1608.

But though table knives are comparatively recent, knives for general purposes were one of the first inventions of early man. Some dating back to the Stone Age have been found, made of flint, and very similar to the arrow heads and the hatchets the Indians were using when the white man came to America. Spoons, too, have been in use a long time. In museums we often see spoons of wood, stone, and ivory which were found in ancient Egyptian tombs. The Greeks and Romans used spoons of bronze and silver, and during the Middle Ages spoons of bone, wood, and tin were common; the wealthy had spoons made of beaten silver. Forks came long after knives and spoons, and were long used only in cooking or for holding the joint of meat while it was being carved. The first forks were two-pronged affairs, much like our carving forks, and were made of iron, bone, or even hard wood.

The use of the fork at table seems to have been introduced into Europe from the Orient through Venice. A story of the 11th century tells of the wife of a Venetian ruler who was "luxurious beyond belief," because, "instead of eating like other people, she had her food cut up into little pieces and ate the pieces by means of a two-pronged fork." When the custom of using a dining fork was brought to England in 1608 by a traveler who had observed it in Italy, it caused a great deal of excitement. He was laughed at by some, and railed at by others, one person declaring that it was an "insult to Providence, who has given us fingers." Even today forks are not used in many parts of the world. The Persians and the Egyptians, for example, think the European method of eating very queer; and most of the Chinese and Japanese use chop-sticks.

Most American cutlery is made in Massachusetts, New Jersey, New York, New Hampshire, Connecticut, and Ohio, but the United States has no great cutlery manufacturing center such as exists in England, France, or Germany. Sheffield, England, has long been famous for the high quality of its cutlery since the days of Chaucer.

The making of fine steel knives is a complicated process. In the first place the steel must be very hard, and carefully forged, tempered, and ground. Putting the knife into its handle of horn, bone, ivory, tortoise shell, celluloid, or silver, known as "hafting" the blade, is such a delicate task that it is a special trade. Silver-plated ware is made by electroplating some cheaper metal, which has been shaped and cut with dies. (See *Electroplating*.)

KNOTS, HITCHES, AND SPLICES. A scientist who wanted to test the intelligence of monkeys once cut the rope which held up the swing of his pet chimpanzee. The ape fretted and grieved over it, but it never occurred to him to mend the rope with a simple knot. Tying knots is indeed a special accomplishment of mankind. You might almost say that if you trace the thread of civilization you will find it fastened in many places with knots—from the naked savage tying a crude hook to his sea-weed fishline, to the dock-hand mooring a great ocean liner to its pier with giant hawsers.

To know how to tie knots properly saves much time and trouble, and in some cases even lives depend upon it. The sailor aloft in a ship's rigging, the cowboy roping a wild steer, the steeple-jack dangling high in the air, the lumberman balancing on a logboom—all of them know what will happen if a knot slips.

Some knots are valuable because of the speed with which they can be made. But the best knots are those that hold firmly without slipping, yet do not bind so tightly that it is hard to untie them when their work is done. Most of the simpler knots which are described below meet this requirement.

Knots

When a rope is bent in a loop, the looped part is called the *bight*. The long portion of the rope is known as the *standing part*, and the short part, used in forming the knot or hitch, is known as the *end*.

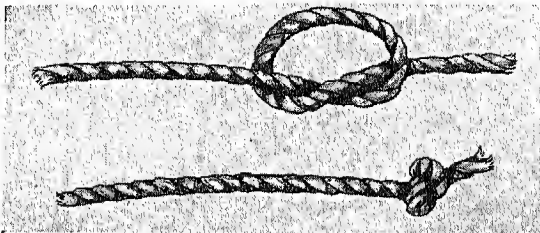


Fig. 1.—Overhand Knot

Standing part of the rope is held in the left hand and the end is passed back over it, and put through the loop just formed.

The simplest knot that is made is the overhand knot (Fig. 1). It forms a part of many other knots. It is used to keep the end of a rope from raveling, to provide a hand-hold on a halter or bell rope, to prevent the end of a rope from running through a pulley, or a sewing thread from pulling through cloth. The

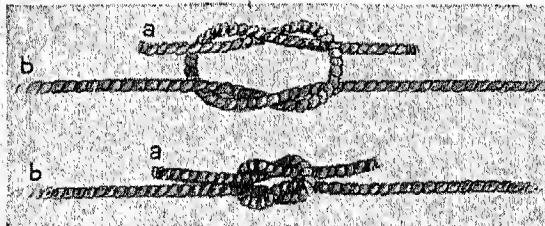


Fig. 2A.—Square Knot

The illustration shows the proper way to tie two pieces of rope together. The ropes are passed once around each other. The ends are then brought up and the process repeated, care being taken that on each side the standing part and free end (a, b) come out on the same side of the loop. When drawn tight, the free ends will lie parallel to the standing parts.

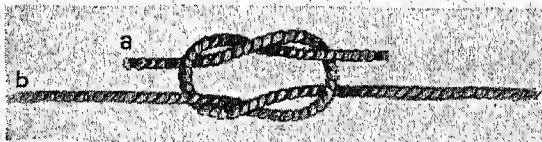


Fig. 2B.—Granny Knot

This unreliable knot results when the second twist, instead of following the square knot rule, is made in the reverse direction, so that the parts (a, b) are separated from each other by a part of the loop. When this is drawn tight the ends stick out at right angles to the knot.

square or sailor's knot (Fig. 2A) is the commonest of all knots for fastening ropes or strings together. When correctly made, it is as perfect as a knot can be, for it is reliable, and unties easily. If we tie our shoe laces correctly, we use this square knot, although the ends are not pulled clear through but are looped and drawn tight. When a square knot is tied without a single or double bow, we call it a "hard" knot. Its one disadvantage is that it will not hold so well when made with ropes of different sizes. This knot is always used when the sailor reefs the sails, for even

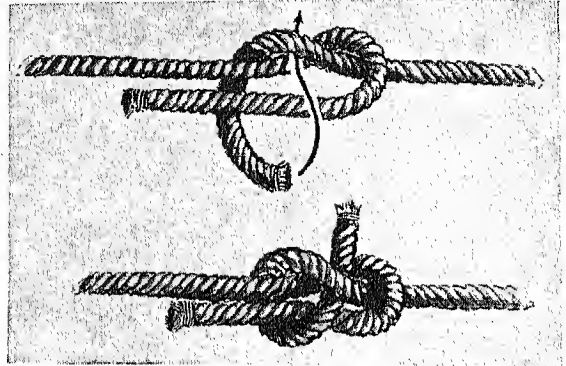


Fig. 3.—Weaver's Knot

This also begins like a square knot, but one of the ends thrust back under itself and comes out at right angles to the knot.

with stiff wet ropes it can be loosened easily by pushing the free ends back against the knot, and completely untied by pulling at the loops which appear.

Sometimes when we are tying our shoe laces we make a mistake and instead of making a square knot, we get the troublesome granny or lubber's knot, which

Fig. 4.—Running or Slip Knot

A bight is first formed and an overhand knot made around the standing part.

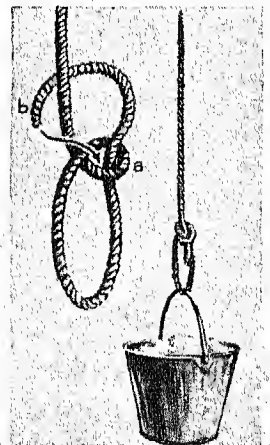
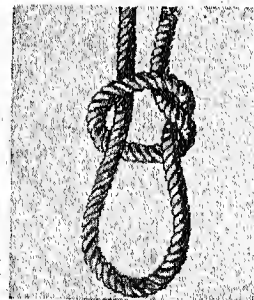


Fig. 5.—Bowline

Make a loop (a) and pass end (b) through it. Now carry end as indicated around the rope above the loop and then back through the loop again, and draw it tight. When tying an animal or fastening a rope to a bucket, the end (b) is first passed around the animal's neck or around the bail of the bucket, before going through the loop (a).

slips easily and gives way under a strain (Fig. 2B). Many people go through life with their shoestrings always dangling without realizing that they are making themselves much useless trouble by not learning

the difference between these two knots. The weaver's knot is another knot for tying ends of rope together (Fig. 3). Weavers use it to tie together ends of threads, as it passes smoothly through the needle. One of the simplest "eye" knots is shown in Fig. 4, and is known as the running or slip knot.

The bowline is one of the best and most useful of all the knots; indeed it is often called the king of knots (Fig. 5). It will not slip and is widely used—on the farm, in construction work, by mechanics, and in nearly every line of industry. It is the safest knot to put around an animal's neck. It is often used in fastening a rope to a bucket to hoist material, such as tools or mortar, to workmen on a scaffold. A close relative of this knot is called a "bowline on a bight" (Fig. 6). Being made with a loop or bight of the rope, it is much stronger and does not require the use of either end of the rope in tying it. With this knot a man can be lowered in safety from a great height.

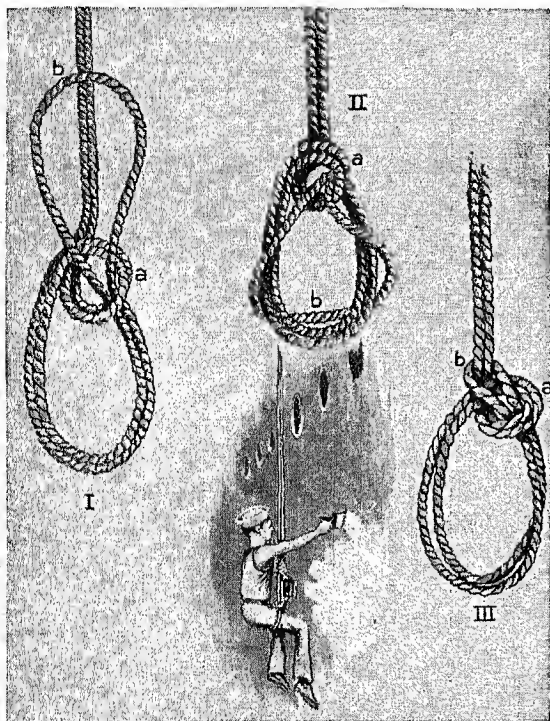


Fig. 6.—Bowline on a Bight

Make a loop (a) and pass the end of the bight (b) through it as in Part I. Now hold the loop in the left hand and pull the bight down and around the hanging part as in Part II. Now raise the bight (b) up above the loop (a) and draw it down tight as in Part III.

Sailors paint the sides of a ship swinging comfortably in the loop of this knot. It is used also to hold ships to their mooring posts.

Hitches

Although there is no sharp distinction between knots and hitches, the name "hitch" is usually applied to those temporary devices which are not, as the sailors say, "made fast." A knot is thus the more permanent fastening. Another difference is that a

knot may be made in the rope itself without requiring anything else for its security. A hitch, on the other hand, usually takes the form of self-binding loops around some solid object, and will come loose as soon as the strain is removed. The sheepshank is the most practical and satisfactory way for shortening a rope without cutting it and many times this hitch proves of use to sailors (Fig. 7).

The halter hitch has many uses, the most common one being to fasten the halter ropes of horses or cows to the manger or to a post or hitching ring (Fig. 8). When a halter hitch is properly made, it will slip tight, and therefore should never be used around an animal's neck. An even better halter tie is shown in

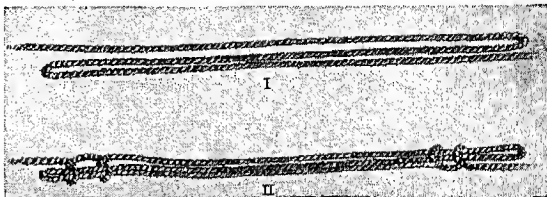


Fig. 7.—Sheepshank

Fold rope back on itself forming a double loop of the required length (I). Then weave a clove hitch (Fig. 11) with the standing part of the rope over each end of the double loop (II), and draw tight.

Fig. 9. This is called the "figure eight" tie, and no matter how tight it has been drawn by the animal, it can easily be untied by jerking the loose end of the rope.

The clove hitch, the best known of all the hitches, is easy to make and the harder the pull against it the tighter it holds. The foundation of it is the half-hitch (Fig. 10, I). It is, in fact, sometimes called the "double half-hitch." It will serve well as a fastening whenever the rope is to have a constant and steady

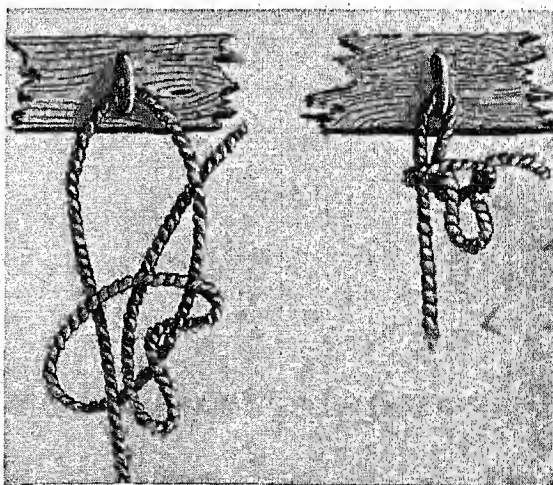


Fig. 8.—Slip Knot Halter Tie

Put end of halter rope through ring or hole in manger, then tie a slip knot as in Fig. 4, except that the end of the rope is not pulled all the way through, but is left to form a loop.

strain upon it. It is always easy to loosen it, even

when made with a hard wet rope. In Fig. 11 the clove hitch is used to make a running noose.

Splicing a Rope

Few people know how to splice a rope, yet a knowledge of splicing is valuable in many ways. A

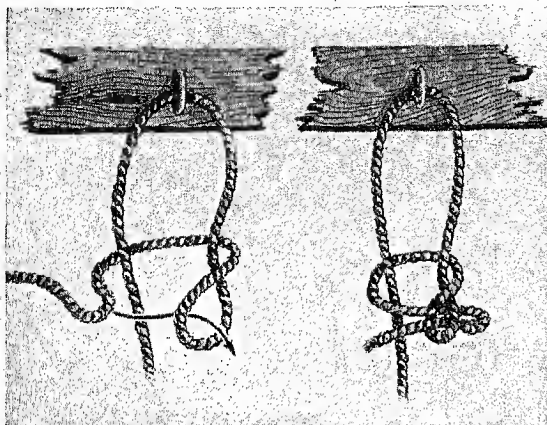


Fig. 9.—“Figure Eight” Halter Tie

The difference between this knot and plain halter tie lies in the extra twist given the first loop, before the second loop passes through it.

worn or broken rope can be neatly mended by this means, and a good splice is always stronger than a knot. Splicing is necessary if the rope is to pass through pulley blocks where knots cannot be used.

The simplest type of splice is the short splice. In making this the strands of each rope are spliced into the strands of the other rope. First the strands

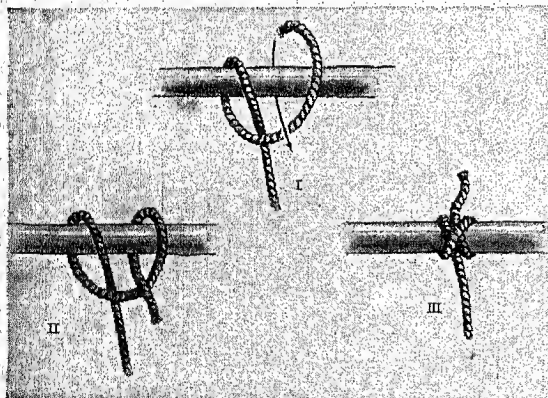


Fig. 10.—Clove Hitch

To put the clove hitch on a stake or other support, the top of which can be reached, make a half-hitch or loop (I), passing the right hand part of the rope under the left. Now hold the first loop in the left and make another one exactly like it with the right (II). Now slip the right hand loop over the left hand loop, and drop the two loops over the stake, drawing them tight. When the clove hitch is put around a tree or high pole, the end has to be passed around and woven under and over to get the same effect.

of each rope are untwisted (Fig. 12). Then the ends are brought together so that strands *a*, *b*, and *c*, alternate between strands *d*, *e*, and *f*. When they have been pushed together as far as they will go (II) they may be tied with a string to hold

them in place during the remainder of the operation. Taking one of the strands (*a*, III), it is passed over the twisted strand nearest to it and under the next to it. The same thing is done with strands *b* and *c* in one direction and with *e*, *d*, and *f* in the other direction. The process is repeated (IV) until all the six loose strands have been woven over and under into the solid body of the rope. Care must be taken that the separate strands do not unravel during the splicing. The short splice, of course, makes the joint double the thickness of the rest of the rope (V). In splicing hard-twisted ropes, a pointed peg or “marlin spike” is often used for making the openings under the twisted strands so the loose strands can pass through more easily. The eye splice is made according to the same prin-

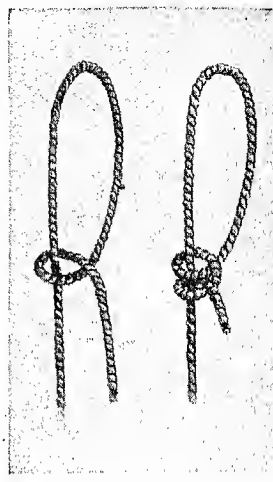


Fig. 11.—The Clove Hitch Slip Knot

In this knot the rope is looped over and a clove hitch is made around the standing part.

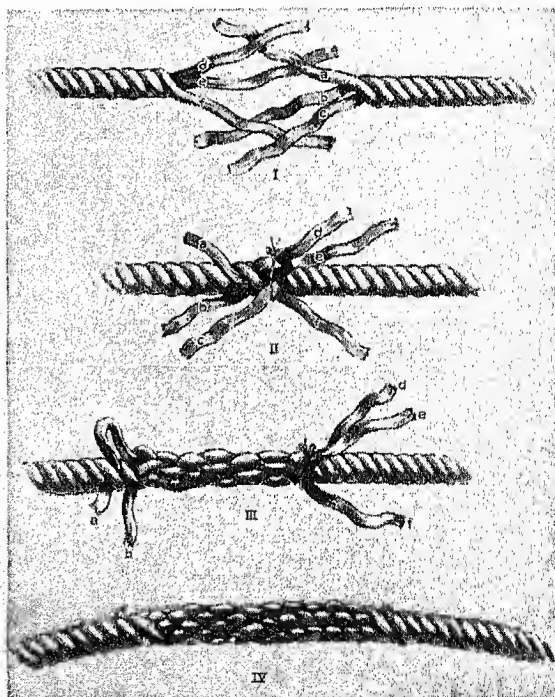


Fig. 12.—The Short Splice

ciple as the short splice, except that the end of the rope is woven back into itself, forming a loop, which in this instance is called an “eye” (Fig. 13). The

rope is untwisted for 6 or 8 inches, and the untwisted ends are doubled back against the main part of the rope to form a loop of the size desired (I). Each of the loose ends is then passed over the nearest strand and under the next (II) until the splice is completed (III). It will be noticed that here, as in the short splice, the loose ends are woven around in the reverse direction from the twist of the body of the rope.

Another common splice is the so-called "long splice." It is used when the rope must pass through a block, and the thick short splice would not pass.

KNOX, JOHN (1505?-1572). Seldom has a man so imprinted himself upon a nation as did the religious reformer John Knox upon the people of Scotland. When Luther nailed his theses to the church door at Wittenberg, in Germany, Knox apparently was a boy of about 12, attending school in his native Haddington, not far from Edinburgh. Later he attended the university and became a priest.

Nowhere was the church of that day more corrupt and oppressive than in Scotland. The powerful Cardinal Beaton, chancellor of Scotland, atoned for the scandal of his private life by the zeal with which he persecuted heretics. His murder in May 1546 is attributed to revenge for his burning of the reforming preacher George Wishart. Seizing the cardinal's castle of St. Andrew's, his murderers stood siege there, and among the strangely assorted company of sympathizers who flocked to their aid was John Knox, already a hunted man for his friendship with Wishart. Here Knox received a literal "call" to his lifework from the assembled company of reformers, and it was in these stirring surroundings that he first preached his doctrines of reformation.

In June 1547, the castle surrendered to a French fleet, for Scotland was then bound in close alliance with France. Knox and other captives were carried to France and condemned to labor at the oar in the galleys. Released in 1549, he took refuge in England, but with the accession in 1553 of Mary Tudor, that "cursed Jezebel," as Knox termed her, England ceased to be safe for Protestants. The next five years he spent chiefly in Geneva in contact with Calvin and Calvinistic doctrines.

The French regent of Scotland, Mary of Guise, who had earlier felt compelled to temporize with the powerful Protestant party in Scotland, believed herself strong enough in 1559 to defy it, and forbade the reformed preaching. When Knox arrived in Edinburgh, in May of that year, he was by her orders

"blown loud to the horn" as an outlaw. He escaped to Dundee and Perth, where his sermons against "idolatry" were like sparks to tinder. The "rascal

multitude" rose and sacked abbeys and monasteries, leaving only the walls standing. Civil war followed. To counterbalance the French alliance, on which the regent relied, the Lords of the Congregation, as the Protestant chiefs were called, appealed to England, where Elizabeth now reigned in place of Catholic Mary. Although Elizabeth did not love Scotch Puritanism, and had been deeply offended by Knox's 'First Blast of the Trumpet

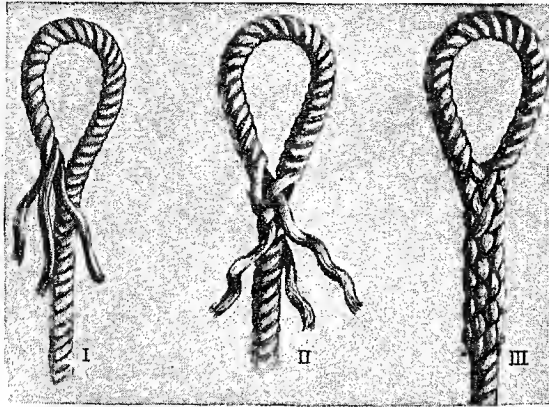


Fig. 13.—The Eye Splice

against the Monstrous Regiment of Women,' a tract arguing against the fitness of women for rule, written during the reign of Mary, policy demanded that she support a movement likely to weaken the hold of France and Catholicism on Scotland. Mary of Guise died almost at the moment of Protestant victory. A treaty signed June 6, 1560, withdrew the French troops and left the Lords of the Congregation the masters of Scotland.

Knox's power was now come to flood-tide. Parliament abolished the pope's authority in Scotland, and forbade the celebration of Mass under heavy penalties. When young Mary Queen of Scots, lately widowed of her French boy husband, returned to Scotland, in 1561, only the drawn sword of her half-brother, Lord James Stuart, secured her the privileges of the outlawed faith in her private chapel. Loud and bitter were the protests of Knox, and Mary humbled herself in repeated interviews with him. Knox, flint to blandishments and arguments alike, left her weeping tears of impotent anger. So began a duel which ended only when the queen, as a result of her own criminal folly in marrying her husband's murderer, had fallen from her high estate and become a fugitive and a prisoner—in the end a martyr—in England. (See Mary Stuart, Queen of Scots.)

After preaching the coronation sermon of Mary's baby son James, Knox retired from public life on account of failing health, and died three years later. The deposition of Mary and the rule of a Protestant regent seemed to guarantee that Knox's work should not be undone. Nor was it, for though vexatious strife between "kirk" and crown continued long after his death, Puritan Presbyterianism continues to this day to be the creed of the "established kirk" and the mold of Scotch character. In large part this was due to the deep sincerity and conscientiousness of one who, however harsh, dogmatic, and intolerant he was, "neither flattered nor feared any flesh."

KORAN. On the Koran, the sacred book of the Mohammedans, is based the religion of about 225,000,000 people. The name means "the Reading," or the book to be read. It is used in public worship, is the chief textbook in Mohammedan schools, and is the standard of all law and practice among all devout Mussulmans.

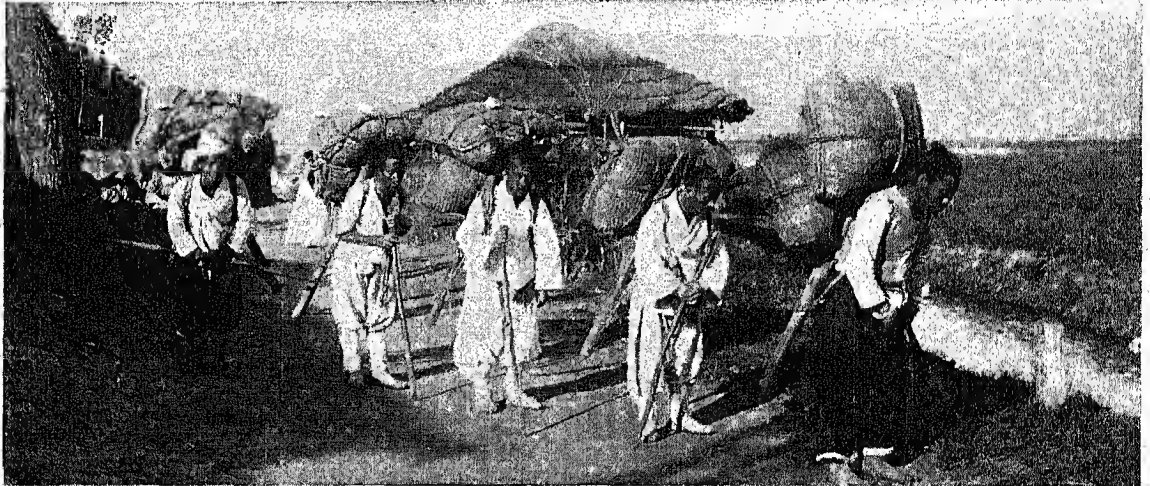
The Koran is regarded by the Moslems ("the faithful") as the word of God revealed to the prophet Mohammed, through the angel Gabriel. Its various parts were written down from the prophet's lips, from time to time, by the prophet's scribes, on dried leaves, bits of leather, whitened shoulder blades of sheep, or whatever else was at hand. After the death of Mohammed these fragments were gathered together, copied, and arranged roughly in the order of their length without regard to content. Thus the book has "neither beginning, middle, nor end." The original writings were then destroyed.

The Koran, which is written in Arabic, is about as long as the New Testament, and is divided into 114

suras, or chapters. Each of these begins, "In the name of God, the merciful and compassionate." The book consists of history, legends, prophecies, moral precepts, and laws. The histories are chiefly about Old Testament characters, and many of the doctrines and laws are the same as those of Judaism or of Christianity. Moses, Jesus, and Mohammed are named as the greatest of the prophets sent by God to lead mankind in the path of truth.

The fundamental doctrine is the oneness of God, expressed in the simple statement, "There is no God but God (Allah)"; and submission to His will (Islam) is the highest virtue. Much emphasis is laid also on the Last Judgment, when everyone shall receive reward or punishment for his deeds. The faithful Moslem is commanded to pray five times a day, turning his face toward Mecca, to fast at stated times, to give alms, and to make at least one pilgrimage in his lifetime to Mecca, the sacred city. Both the civil and criminal laws of Mohammedanism are based on teachings of the Koran. (See Mohammed.)

The "LAND of MORNING CALM"



How would you like to carry a 300-pound barrel of flour on your back several miles for ten cents? That is a sample of the pay these Korean coolies get for their work. With the aid of those wooden racks, they carry enormous loads for great distances.

KOREA. After the Japanese annexed Korea in 1910, they officially called this peninsula by its ancient name "Chosen." This means "Land of the Morning Calm," and in ancient times the name fitted the country well. As an independent kingdom for more than 3,000 years Korea had a rich culture, stimulated by China. It developed a large literature and a phonetic alphabet. As early as the 15th century Korean printers were using movable metal type. In the 16th century a Korean admiral invented an iron-clad ship propelled by oars. The culture of Japan itself had been quickened by borrowing the Buddhist religion from Korea

Extent.—North to south, 600 miles; east to west, 135 miles. Area, 84,738 square miles. Population, about 23,000,000.

Physical Features.—Ham-gyong-Do and Kang-wong-Do mountains; highest peak, Pel-shan, an extinct volcano (8,900 feet). Yalu and Tumen rivers in the north; Han and Tai-dong rivers in the west.

Products.—Rice, wheat, and other grains; beans, cotton, tobacco, silk; cattle; gold, copper, iron, coal, and graphite; whale and fish.

Principal Cities.—Seoul or Keijo (capital, 400,000); Fusan, Pingyang or Heljo, Taikyu, Jinsen (more than 100,000).

Government.—An integral part of Japan since 1910, under a Japanese Governor-General assisted by an Advisory Central Council.

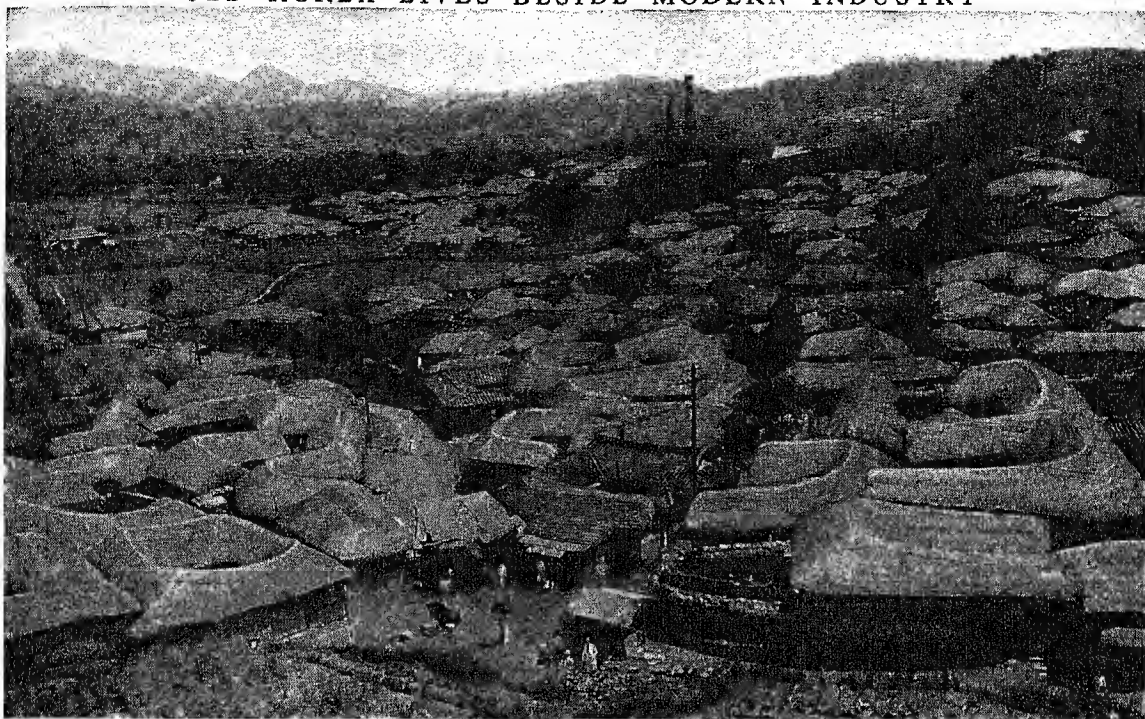
as well as Korean literature, as early as the fourth century of our era.

Yet after Korea fell into Japanese hands in 1910, it became known as a "land of suffering." The

hardships that came to the people were a direct result of their geographical location. Korea's position inevitably made it a first steppingstone in Japan's invasion of the Asiatic mainland.

The Korean peninsula thrusts out between the Yellow Sea and the Sea of Japan. The Japanese island of Kyushu lies only 120 miles away. Harbors on the irregular west side of its 1,740 miles of coast line give many footholds on the continent. Despite the high

OLD KOREA LIVES BESIDE MODERN INDUSTRY



Level land is scarce and the gentle, pleasant Koreans are sociable; so in a typical village, houses huddle close together. The huts are made of poles, thatched with rushes or bamboo, plastered with mud, and usually roofed with rice straw. A heavy red tile roof is a mark of rare prosperity. Koreans sleep on mats on the earth floor, ingeniously warmed by underground flues carrying heat from outdoor cooking ovens. The factory chimneys in the background and the telephone lines are the work of the Japanese.

rise and fall of tides, in some places about 30 feet, Japan was able to establish many strategic seaports—notably Jinsen (Chemulpo) and Chinampo on the west and Fusan on the south. On the northeast coast Rashin and Seishin gave quick access to Manchukuo when Japan in 1931 began its march of conquest into that country. They also command the southern approach to the Siberian stronghold of Vladivostok. Korea is separated from Manchukuo by the Yalu and Tumen rivers, and from Siberia by the Tumen.

Korea is a little larger than Kansas. The peninsula extends from north to south about 600 miles, in about the same latitude as the area from Maine to North Carolina. The bleak northeast where few people live has snow in winter. But most of Korea has the sub-tropical climate of the "cotton belt" type. The sharp changes caused by the seasonal monsoons are tempered by the seas that encompass the peninsula. The annual rainfall is about 36 inches, most of it from April to July.

About three-fourths of the country is mountainous or hilly. In the north some peaks, notably Pei-shan, rise over 8,000 feet. A sprawling range runs southward the length of the peninsula, with spurs jutting westward to form gorge-like valleys, where most Koreans live. There is splendid hunting for tigers, leopards, bears, foxes, deer, and antelope. Marten, otter, and beaver haunt the woods and the many streams. Although only about a fifth of the total area can be

farmed, about three-fourths of the people are farmers, scratching out a living from tiny plots that average four acres. Nearly a third of the crop land is in rice. The rest is planted to barley, wheat, millet, soy beans, and some cotton, tobacco, and mulberry trees for silkworms. Oxen pull clumsy wooden plows, but most of the work is done by hand. Women rarely work in the fields, and have small say in public affairs. In some villages, men still wear traditional tall stiff hats of horsehair or split bamboo. They live chiefly on grains, with a little fish, and virtually no meat.

Results of Japanese Rule

This meager land was developed by Japan into a "rice bowl." Irrigation, fertilization, and seed selection doubled the rice crop. About half is exported to Japan. But this leaves Korea hungry. Even with increased crops there is still not enough for both export and home consumption. Between winter and spring, about half the farmers "search for edible weeds, roots, and bark on the hillsides." Many farms have passed into the hands of Japanese owners.

Japan has developed some industry and trade. It takes virtually all the exports. Parts of the once richly timbered areas, shorn by the Koreans in need of fuel, were reforested with pine, oak, chestnut, and evergreens from Japan. Some paper and pulp mills were built. Considerable beds of coal and iron and rich gold mines formerly owned by British and Americans help to supply Japan's needs. Silver, lead,

tungsten, molybdenum, and copper are also mined. A giant dam completed on the Yula River in 1941 furnishes hydroelectric power for electrochemical industries, notably fixation of nitrogen for fertilizer and munitions. More than 3,000 miles of railway and about 19,000 miles of roads were built. Air lines link Seoul (Keijo), the capital, with other centers.

But Koreans shared little in these improvements. Japan dominated trade and industry, and tried to stamp out national spirit. It provided few schools. Koreans were ordered to take Japanese names, and forbidden to talk their native language, publicly celebrate their great holidays, or wear native festival costumes. Christian missionaries were deprived by law in 1940 of foreign financial support and thus forced to give up their work.

Records of the kingdom of Korea begin in 2333 B.C. Civil wars weakened the country, and in the 14th century Korea accepted protection by China. For years Korea was a prey to the conflicting ambitions of its neighbors. From 1592 to 1598, the Japanese pillaged the land. Thereafter for more than 250 years, Koreans kept almost entirely to themselves. In 1876 the Japanese forced the opening of its ports to Japanese trade, a factor in bringing about the Sino-Japanese War (1894-95), which left Japan in control. Then Russia by diplomacy dominated Korean affairs until the Russo-Japanese War (1904-5). The war settlement guaranteed Korean independence, but in 1910 Japan annexed Korea and in 1919 incorporated it into the Japanese Empire. During World War II, Koreans served in the Chinese and Russian armies.

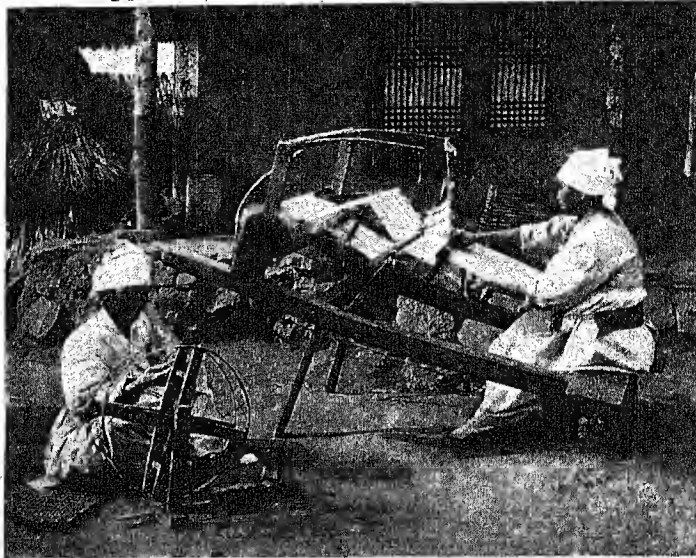
KOSCIUSKO (*kô's-sî-'ûs'kô*), THADDEUS (1746-1817). Like Lafayette, this gallant Polish general and patriot won fame as a champion of freedom on two continents. Of noble family, his talents attracted attention while he was still a military cadet at Warsaw, the Polish capital, and he was sent abroad at the expense of the kingdom to complete his military education by seven years' study in Germany, Italy, and France.

An unhappy love affair led the young captain of artillery, in 1776, to leave Poland and offer his sword to the new republic across the Atlantic. Congress made him a colonel of artillery and he served with distinction as an engineer to the end of the war. The first fortifications at West Point were among the works constructed by Kosciusko. At the close of

the war he was rewarded with the thanks of Congress, the rank of brigadier general, an extensive grant from the public lands, and an annual pension.

Unhappy Poland meanwhile was succumbing to the external aggression and internal anarchy which were to remove her for over a century from the list of independent states. Kosciusko returned in time to fight valiantly but unsuccessfully at Dubienka and

THE TEXTILE INDUSTRY IN KOREA



Korea has a small textile industry, carried on chiefly in homes. The women are kept busy making thread and cloth for the baggy, white cotton garments and thick padded socks worn by women and men alike. Notice how primitive their spinning wheels and looms are in comparison with those used by our colonial ancestors. Despite the efforts of the Japanese, little cotton is grown except for home needs.

Russians at Maciejowice (Oct. 10, 1794)—where Kosciusko himself was seriously wounded and left insensible on the battlefield—ended Poland's chance of withstanding her greedy and powerful neighbors. Well might the poet say that "Freedom shrieked when Kosciusko fell."

After his release from Russian imprisonment (1796), Kosciusko revisited America and resided for a time in Philadelphia. Unlike other Polish patriots, he refused to enter the service of Napoleon Bonaparte, for his American experience had made him a democrat of the school of Jefferson. His remaining years were spent chiefly in Switzerland, where he died in 1817. His statue stands in Washington, with those of generals Lafayette, Pulaski, and Steuben, in a public park before the White House. (See Poland.)

KOSSUTH (*kô'sh'ut*), LOUIS (1802-1894). A brilliant Hungarian lawyer, fiery orator, and Liberal journalist, Kossuth found his chief opportunity when the waves of political revolution spread from France in the years 1848-49 over almost all Europe. He had begun his political career a dozen years before by circulating Liberal publications, first in manuscript, and then in lithographed copies to avoid the government censorship; and for his activity he was condemned in 1837

to four years' imprisonment. From the study of the Bible and Shakespeare during his confinement he gained a wonderful knowledge of the English language. Then, in the Hungarian Diet, his advocacy of freedom of the press and abolition of all feudal privileges had made him the chief leader of the Liberals in the Hungarian part of the Austrian Empire.

With Austria convulsed by the revolution, Kossuth, now become practically dictator in Hungary, advanced to a formal declaration (April 14, 1849) that the Hapsburg house, "perjured in the sight of God and man, had forfeited the Hungarian throne." But his rashness and egotism alienated other Hungarian leaders, while his assertion of Magyar rights led the South Slavs to join with their Austrian masters. The revolution in Hungary, however, was put down only by the aid of a Russian army sent by the Czar (June-August, 1849).

Kossuth was now compelled to flee into Turkey for refuge. Austria and Russia both demanded that he be given up for execution, but England and the United States prevailed on the Turkish government to refuse. In 1851 an American warship carried him to France. In England he was greeted with an enthusiasm similar to that which had welcomed Garibaldi ten years before.

When he visited the United States (1851-52), Kossuth's welcome was equally cordial. He addressed large assemblies in behalf of Hungarian independence; but his eloquence brought no substantial result, in spite of the general sympathy for himself and his cause. He returned to England in 1852, where he remained most of the time for the next 17 years. When his rival Déak brought about the reconciliation of Hungary with the Hapsburg dynasty (1867), Kossuth refused to avail himself of the general amnesty to return to his native land. He remained in Turin, Italy, where he died on March 20, 1894.

KURDS. When we hear the name of the lawless and savage tribes of Asia Minor known as the Kurds, our first thought is of the terrible massacres which they inflicted on their neighbors the Armenians, both before and during the World War of 1914-18. The hostility which resulted in these dreadful atrocities is of comparatively recent origin, for it arose largely from the movement to create an independent state of Armenia and was fomented by the Turks as an additional means of repressing the Armenians.

Like the Armenians, the Kurds belong to the Indo-European stock, but unlike the Armenians, they are Mohammedans. They number between one and two millions and live mostly in an ill-defined mountainous territory known as Kurdistan in northern Persia, northern Iraq, and the eastern part of Turkey. To all their settled and peace-loving neighbors the Kurds are much-dreaded marauders who kill and rob travelers and pillage crops. With their close-fitting yellow fur caps and the arsenal of small arms that hangs from their belts they present a most forbidding appearance. The few Europeans, how-

ever, who have dared to visit them in their own mountain villages have found them a people with whom hospitality is as much a part of their religion as war. They live in one-story mud huts, sometimes dug into the ground like cellars. The nomadic members of the community inhabit chocolate-colored felt tents and wander from one mountain pasturage to another with their flocks.

The Kurds are now mostly scattered tribes representing no concentrated power, but at various times in the past, notably in the days of the Crusades, they have been important in a political as well as a military way. They have never been more than nominally subject to the changing rulers and conquerors of the Iranian plateau.

KYOTO, JAPAN. For more than a thousand years Kyoto (or Kioto) was the political, intellectual, and artistic center of the Mikado's empire, and it justly lays claim to the title of "the Rome of Japan." Rich in history and legend, a city of ancient temples, beautiful palaces, and rare treasures of art, Kyoto epitomizes all that is most admirable and interesting in old Japanese civilization.

The natural surroundings are a fitting frame for a city devoted to art. Wooded hills, perennially green, encircle it, and the River Kamogawa, for the greater part of the year little more than a rivulet, meanders through its midst. Tucked away under shelter of the hillsides are picturesque old Buddhist and Shinto monasteries, shrines, and pagodas. On the sunny lower slopes are country estates of wealthy Japanese, surrounded by beautiful gardens, persimmon orchards, and tea plantations.

Kyoto tea is considered the finest grown in the empire. Indeed it is thought to be far too good for export trade, so practically the whole crop is consumed by the Japanese, who think it a great delicacy. In early summer, when the first green tea leaves are being gathered, the suburbs of Kyoto present a very lively scene. The work must all be done by hand, and every available man, woman, and child is called in to help. The shouts of laughter and snatches of song coming from the merry groups among the tea bushes are more suggestive of a family picnic than a hard day's toil. Never is the countryside more picturesque than during the sunshiny days of the tea-picking season.

In the manufacture of pottery, bronze, and ivory wares, of cloisonné, damascene (*see* Japanese Art), and silk, Kyoto surpasses all other cities in Japan. Indeed all art fashions may be said to originate in Kyoto, where the custom still prevails of handing down from father to son the secret processes of expert handicraft. So here are manufactured much of the porcelain, embroidery, brocades, fans, and dyed silks, as well as modern toys, that are so popular in Europe and America.

Kyoto is still the goal of devout pilgrims from all parts of the empire. Within its borders are nearly a thousand temples and shrines, many of which appear

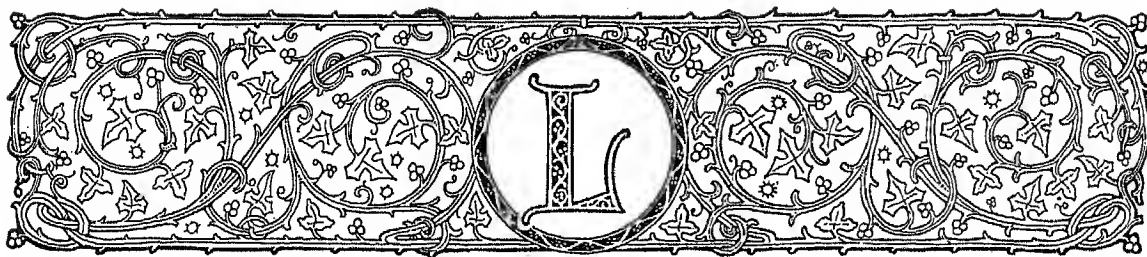
in the most unexpected places—in the heart of the business districts, on Theater Street, and in secluded gardens. Having been the dwelling places of many Mikados, all of Kyoto's greater temples are palatial, and the landscapes adjoining them are the most celebrated in Japan. Some are hoary with age; others are comparatively modern, having been built by popular subscriptions gathered throughout the country. In one of the newest temples the heavy beams were lifted into place by cables made from strands of hair contributed by pious women.

When the Emperor Kwammu moved his capital to Kyoto in 793 A.D., he had the city laid out, in imitation of the imperial capital of the T'ang dynasty in China, with wide streets intersecting at right angles. The palace grounds with their beautiful buildings and gardens covered about one-fifteenth of the entire area.

Fires have repeatedly devastated the city, but each time it has been rebuilt as far as possible in the original style. During the Middle Ages, when Kyoto enjoyed its greatest prestige, the population is estimated to have been nearly a million. But as Tokyo (the northern capital) grew, Kyoto declined in size and importance, and finally in 1868 the court was moved to the northern metropolis. Today, although its population has risen again to slightly more than 1,000,000, Kyoto has lagged behind other great Japanese cities in industrial development.

One institution in Kyoto is in striking contrast to the many monuments of ancient religious life and thought. This is the Doshisha University, founded in 1875 by the distinguished pioneer of Western learning, Joseph Hardy Neeshima. So, even in Kyoto, new ideas are pressing hard against the old.





The LABOR MOVEMENT and What It Has ACCOMPLISHED

LABOR. Almost any kind of human effort is popularly regarded as labor. Economists apply the word only to productive effort (*see Economics*). But in this article the word is used in a still more restricted sense, referring to the vast body of individuals who work for a wage. Bricklayers, bookkeepers, coal miners, stenographers, clerks, carpenters, farm laborers, journalists, longshoremen, locomotive engineers, schoolteachers—these are but a few of the people who belong to the wage-earning group.

Now, as at all times, the laboring group forms the largest part of the population. But not always has the worker been paid in the form of wages. In ancient Greece and Rome much of the labor was done by slaves, who were supplied with the necessities of life by their masters. Even under the gild system of the Middle Ages, the apprentices and most journeymen were paid largely in the form of food, clothing, and shelter provided by the master. (*See Gilds; Slavery and Serfdom.*)

Not until the rise of the factory system in England in the 18th and 19th centuries did there appear a large group of people who depended for their livelihood on wages alone. The introduction of machinery which could turn out products at lower cost gradually displaced the blacksmiths, weavers, shoemakers, and other "individual producers," who had owned their tools and plied their trades in their own

homes and shops. Shorn of their trade and with nothing to sell but their labor, these skilled craftsmen, and many farmers too, drifted to the cities, where they were swept into the factories and mills as ordinary wageworkers. Out of this new wage-earning class sprang the modern labor movement.

Beginning of the Labor Movement

The labor movement is an organized effort on the part of wage earners to better their status. And under the shocking conditions that prevailed during the early part of the Industrial Revolution there was indeed an urgent need for reform. Workers, including

women and children, labored 12 or 14 hours a day in unhealthful factories, and often were paid only enough to sustain life. The phrase "wage slaves" was little of an exaggeration when applied to these factory workers of the early industrial period. (*See Factories and Factory Laws; Industrial Revolution.*)

Accustomed by the handicraft system to deal personally with their employers, workers at first individually requested better wages and shorter hours; but such demands were almost invariably refused by employers on the ground that there were others who would perform the work under prevailing conditions. Gradually workers realized that, as individuals, they were not equal in "bargaining power" with their employers and that the effective way to enforce their demands was to

TYPICAL INDUSTRIAL WORKERS



This photographic study of two automobile workers going home after a day's work is symbolic of the American labor movement. Confidence, intelligence, and independence are more marked among American union men than among their European brothers.

band together and voice them collectively. Thus, as far back as 1818, the weavers of Oldham, England, signing themselves "The Poor Weavers," sent this petition to the employers of the town:

We the Weavers of this Town and Neighbourhood respectfully request your attention to the wretched situation to which we have a long time been exposed, owing to the extreme depression of our Wages, and request you to call a Meeting among yourselves, and try if there cannot be some alleviation made to our sufferings. . . . We are of the opinion that if you would exert yourselves as a body, the thing might be accomplished without affecting your profits, which we are far from wishing to injure.

Petitions such as this testified to the growing feeling of *class consciousness* among wageworkers, the feeling that they as a group had interests in common, which were opposed to those of the employers. Furthermore, they began to realize that they could do more than "respectfully request" better working conditions. They could combine all the workers of a trade into a single organization called a *trade union*. Through the union, they could unitedly demand better wages and shorter hours; and, if the employer refused, they could *strike*—that is, cease work until their demands were granted.

Rise of Trade Unions in Europe

From the very beginning of the wage system in England, workers banded together in this fashion to gain better conditions. But in England, as in other European countries to which the Industrial Revolution was spreading, such associations were prohibited as a restraint of trade. Despite the threat of heavy fines and imprisonment, however, workers formed secret societies, which agitated for reform. The British government finally passed a law in 1825 granting workers the right to form trade unions, but severely restricting the activities of the unions.

Thereafter the British trade unions, aided by the movement for political reform, grew rapidly in size and power. The Trade Union Acts of 1871 and 1876 accorded full legal recognition to the unions, including the right to strike. The union movement quickly spread throughout industry and trade. At the outbreak of the World War in 1914, there were more than a thousand trade unions, with a total membership exceeding 4,000,000. (See England, section headed "A New Social and Political Order.")

Since England was the first country to experience the Industrial Revolution, it was naturally the leader in the trade-union movement. But the spread of industrialism carried the union movement to France, Germany, Belgium, and, in the 20th century, to almost all Europe. The story of its rise and development on the Continent is much the same as that outlined for England—severe repression, gradual recognition, and then rapid growth. The single striking feature of unions on the Continent was that they were from the start more largely associated with political movements (see Labor Parties).

The Labor Movement in the United States

In the United States the labor movement evolved in a different fashion, and it still remains different from

that of any other country because of certain unique factors in American history. In the first place, there was up to about 1890 an abundance of cheap land in the West, so that when working conditions in eastern industry became oppressive many workers took up farming on the unoccupied land. Furthermore, the scarcity of labor which prevailed for many decades gave workers a relatively favorable position in bargaining with employers. Even when mass immigration from Europe ended the labor scarcity and made working conditions worse, wage earners were hindered from forming strong labor organizations by differences in language, background, and customs. (See Immigration.)

For these reasons, as much as for the basic reason that the factory system was relatively late in developing in the United States, the American labor movement was unusually retarded. When American workers first organized, moreover, it was not in the class-conscious spirit of European labor, which sought sweeping political reforms as well as economic reforms for wage-workers as a class. The American trade union movement began as, and, for the most part, remains today, a method of attaining specific economic goals for wage-workers under the existing capitalist system.

Early History of American Trade Unions

Though trade unions were late to mature in the United States, they existed in the country as far back as 1792. In that year the cordwainers (or shoemakers) of Philadelphia formed a union, and seven years later they even conducted a strike. Before the turn of the century, there were unions among the carpenters in New York, the printers in Philadelphia, and the shoemakers in Boston. These early unions were not very successful in winning better conditions for their members. No effort was made to link the various craft unions in a city or to unite similar craft unions in different cities. Furthermore, the courts often convicted union members on such charges as "conspiracy to raise wages."

The opposition of employers drew the unions together. In 1827 the craft unions of Philadelphia formed the first city-wide organization of union workers, and in 1834 a convention in New York launched a national federation of trade unions. Not until the end of the Civil War, however, and the spread of the industrial system did the union movement take firm root in the national life. By 1870 some 30 craft unions were organized nationally, with more than 200,000 members.

There were sporadic efforts to unite these unions into a national federation, but the first fairly permanent national organization was the Knights of Labor. Organized secretly as the Noble Order of the Knights of Labor in 1869, by Uriah Smith Stephens, the Knights, after they abandoned secrecy about 1880, grew in less than a decade to a membership of 700,000. Unlike the ordinary trade union, the Knights of Labor included all workers, without regard to skill or craft, as well as farmers and small shopkeepers. It led many strikes and was prominent in the struggle for an eight-hour day. Opposition from employers and

internal strife brought swift decline. By 1890 the organization was virtually extinct.

Rise of the American Federation of Labor

The labor movement in its modern form began in 1886, with the organization of the American Federation of Labor (A.F. of L.) out of a union of 25 national craft unions. Under the leadership of Samuel Gompers, the A.F. of L. soon became the spokesman of organized workers (see Gompers, Samuel).

The structure and aims of the A.F. of L. have changed little since the organization was founded. Disavowing political action, the A.F. of L. has always sought to advance the welfare of its members by direct pressure on employers. Structurally, it is a loose alliance of national unions, with the central body (executive council) merely coordinating the activities of its largely independent member unions. Each national union (some are called "international" because they are affiliated with unions in Canada or Mexico) is made up of many local unions consisting of all the organized workers of a single trade in a certain locality. Local unions in a trade that has not yet formed a national organization become *federal unions* controlled by the executive council. City and state federations of labor, grouping all the A.F. of L. unions in a single area, deal with local problems.

Industrial versus Craft Unions

Originally the A.F. of L. consisted only of *craft unions*—that is, unions of skilled workers in a single craft. Craft unionism is often described as *horizontal*, because it groups all workers of the same occupation into a single union, even though they may ply their trades in widely scattered industries. Thus, in a single plant, an automobile company, for example, the foundrymen, machinists, sheet metal workers, electricians, painters, and other skilled workers might all belong to separate craft unions.

The traditional craft structure of the A.F. of L. did not adjust readily to changes in the times. New industrial techniques, which rearranged old skilled trades and introduced others, caused frequent *jurisdictional disputes* between rival craft unions claiming control. These disputes, which were particularly numerous in the building trades, often led to bitter factional strikes at the expense of both the employer and the public. In many of the unions, moreover, leadership tended to become fixed among a small group, and in some local unions a few men continued themselves in power by undemocratic methods.

Furthermore, by concentrating on the organization of skilled workers, the A.F. of L. for a time overlooked vast numbers of unskilled workers in the new mass production industries. To suit the needs of these workers, there arose the *industrial*, or *vertical*, union, which included all workers, skilled or unskilled, in a single industry. Thus, if the automobile company mentioned above were organized on an industrial basis, there would not be perhaps 20 separate craft unions in the plant, but one single automobile workers' union, taking in all employees.

Though the A.F. of L. included some industrial and many semi-industrial unions, the federation was dominated by the craft unions, which opposed the growth of industrial unionism on the ground that the unskilled workers would assume control of the labor movement. Emphasis on the craft rather than the industrial form of organization, a policy established by Gompers, was perpetuated by William Green, who became president of the A.F. of L. in 1924.

Opposition to the A.F. of L.

In protest against the A.F. of L.'s "pure" craft unionism and its nonpolitical policies, there arose in 1905 the Industrial Workers of the World (I.W.W.). Dominated by socialists and syndicalists such as Daniel de Leon, William Haywood, and Eugene V. Debs, the I.W.W. advocated large industrial unions, which would eventually seize political power by means of a general strike. Though the I.W.W. conducted many strikes and rose to a position of power in 1912, it subsequently declined because of doctrinal quarrels.

But the huge development of American industry after the World War of 1914–1918, and the consequent increase in the number of wageworkers, made industrial unionism a permanent issue. In 1920 the A.F. of L. with hardly an effort, increased its membership to a peak of more than 4,000,000. What would be the strength of organized labor if the A.F. of L. were to open its gates to the flood of unskilled workers in the vastly expanded mass production industries?

John L. Lewis Organizes the C.I.O.

This question was officially posed by John L. Lewis, president of the United Mine Workers of America, to the A.F. of L. national convention in 1935. When Lewis' proposal of an organizational drive among unskilled workers was voted down, he, along with the leaders of seven other A.F. of L. unions, formed the Committee for Industrial Organization (C.I.O.) to carry on the campaign themselves. Joined shortly by other existing unions, the C.I.O. began a drive to organize the workers in the steel industry, and in 1937 won a contract with the huge United States Steel Corporation. Soon it gained a firm foothold in other heavy industries and began establishing unions among previously unorganized "white collar" workers.

In 1937 the A.F. of L. expelled the unions that had taken part in the C.I.O. movement, and the following year the C.I.O. took permanent form under a new name with the same initials—the Congress of Industrial Organizations. John L. Lewis was its first president, but in 1940 he resigned when his opposition to the reelection of President Roosevelt failed to win the support of the C.I.O. membership. Shortly afterward, Lewis led his United Mine Workers out of the C.I.O. and attempted to organize a third big union group by recruiting a wide variety of workers, including farm labor, into a subsidiary of the miners' union called "District 50."

By 1941 the C.I.O., with Philip Murray as president, claimed some 5,000,000 members, about as many as did the A.F. of L. At that time more than half a

million wage earners were members of *independent unions*, affiliated with no other groups. The most notable of these were the "big four" railway brotherhoods of engineers, firemen, conductors, and trainmen. The National Federation of Federal Employees, comprising a large percentage of government workers, was another of the independent organizations.

Present Strength of Organized Labor

Thus, spurred first by the C.I.O. and then by industrial expansion for national defense, American trade unions now claimed more than 10,500,000 members—more than a fourth of all nonagricultural workers in the country. With the disruption and suppression of the union movement in Europe during the time when it was growing rapidly in the United States, the American labor movement emerged as one of the most powerful in the world.

This vast development, though quickened by the advent of the C.I.O., had been made possible only by the long series of industrial struggles in which organized labor had pitted its strength against the employers. Notable among the many strikes in American labor history were the railroad strike of 1877; the International Harvester Company strike at Chicago in 1886, which led to the Haymarket riot; the strike at the Homestead works of the Carnegie Steel Company in 1892; and the Pullman Company strike at Chicago in 1894; and the longshoremen's strikes on the Pacific coast in 1934 and 1936. With the C.I.O. came a wave of strikes in the automobile and steel industries in 1936-38, the most outstanding of which were those at the General Motors Corporation and at the Republic Steel Corporation in Chicago.

Labor in Agriculture

The American labor movement has been, as we have seen, almost entirely the creation of the industrial workers and skilled craftsmen. Because of its organization along craft lines, the movement offered little place for the millions of workers in the farms and fields. During much of the country's history, moreover, the farmers were predominantly small landowners, outside the sphere of a union movement. But the increasing mechanization of agriculture and the rise of a large class of landless farmers created a farm labor problem quite as urgent as that in industry.

According to the 1935 farm census, almost 3,000,000 farmers, or slightly less than half of the people employed in agriculture, owned no land at all. More than two-thirds of these were tenant farmers, who rented land, generally for short periods, on a crop-sharing basis (*see Cotton*). Because of low farm prices, as well as droughts, dust storms, and other hazards, many tenant farmers, and small landowners too, were unable to eke out a living for themselves and their families. A number, estimated at 1,000,000 men and their wives and children, became *migratory workers*, moving around the country in search of employment as harvest hands on the great farms.

About a fourth of the migratory workers poured into California, lured by the prospect of work on the big

fruit and vegetable farms of that state. This vast oversupply of labor, coupled with the fact that employment was restricted to the few months of harvest, resulted in great distress. The critical situation of the migratory workers was among the problems dealt with in President F. D. Roosevelt's program for farm relief (*see Agriculture*).

Educational Functions of Trade Unions

Most of us hear of unions only when they are mobilized for "war"—industrial war, in the form of strikes—against employers. But a union, like a nation, lives at peace most of the time. And, like the government of a peaceful nation, it seeks to improve the health, education, and recreation of its people. The unions have done notable work in adult education, offering instruction in economics, history, labor problems, and technical skills. Prominent in workers' education are the Amalgamated Clothing Workers of America, the International Ladies' Garment Workers' Union, and the Workers Education Bureau of the A.F. of L. There are also some independent labor schools training young men and women for positions of leadership in the trade-union movement. To keep their members informed on labor news that often is not covered in the daily press, the unions publish hundreds of newspapers, as well as many pamphlets and books. Frequent radio broadcasts, some from union-owned stations, short motion pictures, and plays present labor's viewpoint.

Many unions pay *benefits* in case of unemployment, sickness, accident, or death. Some provide old age pensions and homes for the aged. Coöperative *labor banks* provide loans and investment opportunities for members (*see Banks and Banking*). Many unions offer members hospital service and reduced rates for medical care. Unions have agitated for low-cost housing and for industrial accident prevention (*see Safety*). Coöperation with employers to insure steady employment has in some cases been realized through joint supervision of production schedules by the union and the management. *Profit-sharing* plans, in which employees share in profits through ownership of stock, have also been developed.

Women are becoming more prominent in organized labor. In a recent year there were about 800,000 women in trade unions, nearly one-tenth of the entire trade-union membership. About half worked in the clothing trades, but women were also numerous in unions of office workers and retail employees. Through *women's auxiliaries*, composed of the wives, daughters, and mothers of members, women take part in the social activities of unions. The Women's Trade Union League, founded in 1903, is a federation of women trade unionists, which takes a leading part in the struggle for women's rights.

Employers' Weapons against Labor

The foregoing story of organized labor's history and present policies continues in today's newspaper headlines. It is, as we have seen, a story of constant movement, whose only pattern is labor's determined

effort to gain for itself a better life. To understand this pattern in its modern form, to understand even the headlines that describe it, we must know the new words and phrases which have grown out of the struggle between labor and management.

In this struggle management's most powerful weapon is its control of employment. An employer can, for example, refuse to hire anyone whose name is on a *blacklist* of persons suspected of union sympathies. He may require new employees to sign a *yellow-dog contract* binding them not to join a union during their employment. If formation of a union is threatened, the employer may hire spies to work in the plant and to report on union activities—a practise known as *industrial espionage*. To forestall an employee-controlled union, the employer may contribute to the support of a *company union*, or *employee representation plan*, in which the employer supervises the workers' organization. If a strike breaks out, the employer can fill the strikers' jobs with nonunion substitutes called *strikebreakers*, or *scabs*. He may also get the courts to issue an *injunction* restricting strike activities. Or he may attempt to "break the strike" by a *lockout*, shutting down his factory until the strikers are willing to return to work on his terms.

Many of these practises, however, have been limited or prohibited by law. In 1932 Congress passed the Norris-La Guardia Federal Anti-Injunction Law, outlawing "yellow-dog" contracts in federal courts and restricting the power of those courts to issue injunctions in labor disputes. Similar laws, applicable in state courts, were subsequently passed by many state legislatures. The Wagner-Connery Labor Relations Act of 1935, which is discussed later in this article, banned as "unfair labor practises" the company union, industrial espionage, and the use of blacklists or any other discrimination against union workers.

Labor's Weapons against the Employer

Just as the employer's most effective weapon is to hire or fire employees, so labor's greatest weapon is its power to strike. There are several kinds of strikes. In the most common form, union members quit work and *picket* the plant, parading in front of it with signs asking the public not to patronize this company because it is "unfair to organized labor." An agreement not to purchase the products of an "unfair" company is a *boycott* (see Boycott). The *union label*, on the other hand, shows that the products to which it is attached have been made by union workers. While on strike, workers are supported by *strike benefits*, paid from the union treasury. In the *sit-down strike* workers remain in the plant to prevent the employer from operating with nonstrikers. Originating in France, the sit-down strike was extensively employed by the C.I.O. in the automobile and textile industries, until the Supreme Court in 1939 declared it illegal. In the *slow-down strike*, production is deliberately reduced by workers in key positions. The practise of hampering production or of secretly damaging machinery or goods is called

sabotage. This may be employed as a protest against the *speed-up* system, in which the pace of production is quickened beyond the point of safety and health. In support of strikers, workers in other industries may call *sympathetic strikes*. A *general strike* is a cessation of labor by a majority of all the workers in a city, state, or nation. The city-wide strike in Seattle in 1919 and the nation-wide strike in England in 1926 are examples of general strikes.

Collective bargaining is the procedure by which employees, through their union representatives, negotiate with employers. Such bargaining may result in a *union contract*, a written agreement between an employer and his employees, stipulating wages, hours, and working conditions, usually for the period of a year. The contract may provide for a *closed shop*, in which the employer agrees to hire only union labor; a *preferential shop*, in which the employer gives preference to union men in hiring; or it may retain the *open shop*, in which the employer remains free to hire whomever he pleases. The contract may also protect the *seniority rights* of workers who have been employed for the greatest length of time by stating that they shall be the last to be dismissed. To facilitate the collection of *union dues*, the contract may institute a *check-off* system, whereby the employer deducts the dues from the employees' wages and pays them directly to the union.

Conciliation, Mediation, and Arbitration

There are several methods of settling labor disputes. The simplest form is by *conciliation*—that is, when the employer and his employees discuss the issues together. If this fails, the disputants may be brought together by the *mediation* of the government or some other third party. If the dispute still cannot be settled, it may be submitted to the *arbitration* of an impartial board, whose decision (*award*) both the employer and the employees agree in advance to accept (see Arbitration).

To protect the public from the inconveniences, hazards, and economic loss of strikes and lockouts, several states have set up permanent agencies for mediation and conciliation. Laws have been passed forbidding strikes and lockouts without advance notice, and strikes in violation of collective bargaining agreements. Other laws limit picketing and forbid intimidation, coercion, taking possession of an employer's property, and interference with transportation.

Prevention of strikes in national defense industries became an urgent national problem during the second World War. Industrial expansion and rising prices impelled many unions to conduct vigorous organizing campaigns. Strikes resulted in some vital defense industries. To prevent such interruptions, President Roosevelt in 1942 appointed a War Labor Board and gave it broad powers to adjust all kinds of labor disputes. (See Nation at War.)

Laws for the Protection of Wage Earners

Organized labor has helped to bring about many humanitarian reforms. In most industrial countries

laws have been passed regulating the conditions of employment of children, establishing maximum hours and minimum wages for men and women in industry, requiring protection against industrial accidents, and providing compensation for unemployment (*see Employers' Liability; Factories and Factory Laws*).

In the United States labor legislation was until recently largely controlled by the state legislatures and the courts, because of the limitations imposed on the Federal government by the Constitution. Connecticut passed the first labor law in 1813, requiring employers to provide elementary instruction for children in their factories. Massachusetts, a leader in labor legislation, blazed trails for other states by establishing an educational prerequisite for employed children (1836); a ten-hour working day for children under 12 (1842); a state department of labor (1869); an enforceable ten-hour law for women (1874); and an industrial safety law (1877). All states now have legislation restricting employment of children, though several attempts to establish effective federal child labor laws have been defeated (*see Child Labor Laws*). Most states also regulate the wages and hours of women and offer benefits to wage earners in case of sickness, industrial accidents, or unemployment (*see Pensions; Social Insurance*).

"New Deal" Labor Legislation

With the exception of isolated laws applying only to interstate industries such as the railways, the Federal government was not active in legislating for labor until the depression beginning in 1929. Then, under the "New Deal" administration of President F. D. Roosevelt, Congress within a few years passed laws with greater significance for labor than the total of all previous state and federal labor statutes.

The cornerstone of New Deal labor legislation was the Wagner-Connery Labor Relations Act (1935), which has been called "labor's Magna Carta." The act guarantees the right of employees to form unions and to bargain collectively with employers on wages, hours, and working conditions. To protect this right, the act set up a National Labor Relations Board. In case of dispute over employee representatives, the board holds elections in which the employees choose by majority vote the union which shall represent them in dealing with their employer. Through the courts, the board may compel the employer to refrain from unfair labor practices which in any way hinder the formation of a union, and to bargain collectively with the elected representatives of his employees. The act was sharply attacked in some quarters on the grounds that it did not give the employer an opportunity to express his viewpoint, that it placed too much power in the hands of the labor relations board, and that it encouraged strikes. Nevertheless, the act was upheld by the Supreme Court in 1937 and labor board statistics were cited to show that the act averted a large number of industrial disputes.

On the heels of the Labor Relations Act, Congress in 1935 passed the Social Security Act, a sweeping

measure providing a combination of state and federal assistance to the aged and the unemployed, and greatly extending public health services (*see Social Insurance*). The Fair Labor Standards Act of 1938 provided that interstate industries should establish by 1940 a maximum work week of 40 hours and by 1945 a minimum wage of 40 cents an hour. The act also prohibited from interstate commerce any goods produced by children under 16 years of age, and under 18 years of age in dangerous or unhealthful occupations.

Labor's New Status

These far-reaching measures were accompanied by a changed attitude toward labor on the part of the courts. Traditionally the courts had blocked the advance of federal labor legislation as an invasion of states' rights, and of state labor legislation as an invasion of property rights. Now, as many decisions of the Supreme Court indicated, the courts recognized the right of the Federal government to intervene in labor relations, and the right of wage earners to fight through their unions for better working conditions.

The new labor laws, as well as the growth of the union movement, greatly increased the functions of the Federal Department of Labor. Set up as a separate department in 1913 to promote and develop the welfare of wage earners, this department now has broad administrative powers. Its Conciliation Service seeks to avert and mediate industrial disputes; its Women's Bureau and Children's Bureau work for the welfare of employed women and minors; its Employment Service helps to place the unemployed in jobs; and its Bureau of Labor Statistics provides exhaustive research on working conditions.

Labor Legislation in Foreign Countries

Many European countries preceded the United States in enacting labor legislation, chiefly because of their earlier development of the factory system. The first law that may be classed as labor legislation was passed in England in 1802, limiting the employment of children in the cotton mills to 12 hours a day. In 1844 England enacted the first 12-hour law for women in factories; and in 1847 the hours of work for women and children were reduced to ten. A series of "factory acts," chiefly the act of 1901, widened the application and strengthened enforcement of laws restricting hours of labor, protecting trade unions, and reducing industrial hazards (*see Factories and Factory Laws*). Particularly progressive was British legislation on social insurance, which in advance of many other countries gave workers benefits for old age, unemployment, and sickness.

Labor legislation, elsewhere, though it generally lagged behind England's, followed the same pattern. Unusually advanced labor laws were passed at the end of the 19th century by Australia and New Zealand, which were first to enforce the eight-hour day, minimum wage, and compulsory arbitration of labor disputes. Under Bismarck's rule Germany in the 1880's pioneered in the field of accident, sickness, and old-age insurance. The Scandinavian countries later

assumed leadership in extending social insurance. Political developments and growing industrialism after 1918 brought labor legislation in many other countries, especially Canada and other nations of the Americas.

Recent Trends in the Labor Movement

After the World War of 1914-1918, Europe was rocked by great economic and political events which vitally influenced the labor movement. In the democratic countries this period was marked by a vast increase, not only in labor legislation, but also in the union movement. In France the *Confédération Générale du Travail* (General Confederation of Labor), a powerful and influential federation of trade unions, rose to a membership of 5,500,000. The British trade unions, with a membership of about 6,000,000, were largely organized in the Trades Union Congress. Many reforms and much of the strength of European trade unions were eclipsed after 1939, when war brought temporary suppression of many peacetime rights.

The labor organizations in Italy and Germany, after great expansion during the postwar period, ceased to exist in their original form when those countries adopted fascist governments. The trade unions in both countries, as in other nations which Germany absorbed, were taken over by the government and rendered ineffective by a ban on strikes or any form of independent action (*see Fascism; Germany; Italy*). Russian trade unions grew enormously after the Bolshevik revolution in 1917 and now include almost all wage earners. Dominated by the state, the Soviet trade unions serve chiefly as a means of controlling the workers and increasing production (*see Russia*).

International Labor Groups

As early as the close of the 19th century, efforts were made to link the trade unions of the various countries into an international organization which would seek to further the interests of wage earners all over the world. The first such organization was the International Federation of Trade Unions (IFTU), which assumed that name in 1909 upon the adherence of the American Federation of Labor. By 1939 the IFTU claimed a membership of nearly 19 million, scattered in the trade unions of 25 different countries. Its chief rival was the Red International of Labor Unions, a communist federation whose membership was derived largely from Soviet trade unions.

The International Labor Organization, created along with the League of Nations in 1919, sought to benefit wage earners in the countries affiliated with the League. Among its objectives were the elimination of child labor, reduction of hours of work, healthful and safe working conditions, and freedom to form unions. In 1940 more than 50 nations were affiliated with the central body at Geneva, including the United States, which entered in 1934.

Labor Day and May Day

In honor of the wage earners of the nation, the United States and Canada have set aside the first Monday in September as *Labor Day*, a legal holiday. The observance of this day grew out of an annual pa-

rade in New York City by the Knights of Labor on September 5 in the 1880's. Oregon, in 1887, was the first state to recognize Labor Day as a legal holiday, and other states quickly followed. On June 28, 1894, Congress passed a bill making the day a national holiday. All the states in the Union now observe the holiday. In many European countries and, to a lesser extent, in the United States, organized labor and radical political parties hold demonstrations and parades on May 1. (*See also Labor* and the entries following in *FACT-INDEX* at the end of this volume.)

LABOR PARTIES. As labor gained power through organization, political parties arose in most industrial nations to represent the workers in government. In England, socialist movements led to the creation in 1906 of a Labor party, which was closely allied with the trade-union movement. In 1924 and in 1929-31, the Labor party under Ramsay MacDonald governed the country (*see England*). In the British dominions of Australia, New Zealand, and Canada, labor parties gained a prominent place in government after the World War of 1914-1918.

On the European continent, labor parties were also based on the trade-union movement but generally advocated more radical changes in the social order than did the British party. The Social Democratic party took a leading part in the politics of the postwar German republic, until Hitler in 1933 crushed this and all other workers' parties in the country. In Italy, Spain, and all the countries taken over by Germany, labor parties were suppressed when the fascists came to power. The Socialist party was strong in France, Belgium, and the Scandinavian countries; but the Communist party, outside of Soviet Russia, was suppressed in most countries where it had gained any following (*see Communism; Russia; Socialism*).

In the United States was launched the first labor party in the world. This was the Working Men's Party, formed by trade unionists in Philadelphia in 1828. But this, as well as several subsequent national labor parties, was short lived. The Socialist Labor party, founded in 1874, gave way to the Socialist party in 1901, which in turn was split and weakened by the rise of the Communist party.

Organized labor gave little support to any of these parties. Its policy, in general, was to back the major political party which seemed best for labor interests rather than to take direct political action. Consequently there is still no effective national labor party in the United States, though socialist and labor parties have at times gained control in a few cities and states. Among these are the Farmer-Labor party in Minnesota, the American Labor party in New York, and the National Progressive party in Wisconsin (*see Political Parties*). In 1936 the C.I.O., the A.F. of L., and several independent unions created Labor's Non-Partisan League to support President Franklin D. Roosevelt's re-election. The organization later became dominated by the C.I.O., which used it to focus labor's vote in local and national elections.

LABRADOR. Patches and columns of many-colored lights dance fantastically in the midnight sky, above the ice-bound strip of a rugged coast-line rising out of a shadowy phosphorescent sea. "The spirits of the dead are at play," the superstitious Eskimo says, as he looks with awe at the wonderful spectacle of these "northern lights." Presently, when they fade, a fiery dawn breaks forth in splendor, disclosing a wall of giant cliffs washed by the deep blue iceberg-strewn Atlantic—a land where fiords and bays carve their way in and out between titanic lichen-strewn rocks, white with gulls and other sea-fowl.

This is Labrador, the most easterly part of the North American continent, a triangular strip of the Canadian mainland from 10 to 300 miles wide, which politically is a part of Newfoundland. It is a lonely land of brief summers and cold stormy winters, perpetually chilled by the icy blasts that sweep across from the Arctic interior, giving it an average temperature for the year below freezing; and its ports are ice-locked until midsummer by the Labrador current flowing down from the Polar regions. Because of its rigorous climate, there are no farms in Labrador. It is the townless, roadless home of the fisherman and the trapper, of the dog team and reindeer.

The Cree Indian trapper of the south, the squat sturdy Eskimo of the north, and the scattered groups of white settlers are well supplied with firewood, lumber, game, and boots and clothing made of skins. Nearly all do their harvesting in the seas. Almost every man is a fisherman. Even the trapper, who in winter kills fox, marten, lynx, beaver, otter, mink, and other fur-bearing animals, in summer-time goes fishing for salmon and cod—especially the latter, which are so abundant that in Labrador the word "cod" is synonymous with "fish." To these coasts, also, threading their way in and out of the countless fine harbors, come each year venturesome fishing vessels from the south, manned by thousands of stout-hearted vikings of today who carry away with them several million dollars' worth of fish. Indeed, all Labrador has a "fishy flavor," including its exports (excepting those of lumber, furs, and

feathers), which are dry codfish, salmon, seal oil, whale bone, trout, cod oil, and herring.

The English medical missionary, Dr. Wilfred T. Grenfell, for many years did much, by his yachting visits in summer and dog or reindeer sleigh trips in winter, to relieve the suffering and distress among these hardy fisher folk (*see* Grenfell).

The limits of Labrador were long a matter of dispute between Newfoundland and Quebec, but in 1927 the whole area east of the "Height of Land" was awarded to Newfoundland by the Privy Council, the supreme court of the British Empire. This decision gave Newfoundland a territory of 120,000 square miles—more than twice the size of Newfoundland itself.

The population of this vast inhospitable region is only about 4,000, though 20,000 fishermen visit its coast every summer. The interior has forests of spruce pulpwood worth perhaps a quarter of a billion dollars, valuable mineral deposits, and boundless water power at Hamilton Inlet, 250 miles from the sea. The source of this is the mighty Grand Falls (302 feet high and 200 feet wide) whose roar can be heard 20 miles away. If these falls could be turned to work it is said they would develop energy equal to 1,700,000 horse-power—enough to operate a large proportion of all the manufacturing and railways of Canada for many years to come.

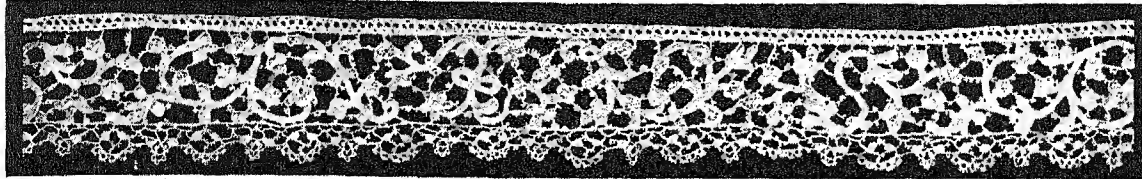
AT THE "TIMBER LINE" IN LABRADOR



This desolate snow-swept scene is typical of the bleak wind-swept interior of Labrador, where the forests dwindle away into the Arctic barrens covered only with sedges and lichens. You see just a few straggling trees emerging above the snow, and struggling to maintain themselves against the hostile environment. They are the northernmost outposts of the great forests, which in the south contain valuable stands of timber—firs and birches and pulpwood.

After John Cabot discovered the coast in 1498, fishermen from England, France, Spain, and Portugal flocked to it, attracted perhaps by Sebastian Cabot's assertion that codfish were so numerous that "they sumtymes stayed his shippes." The interior was practically unexplored until 1840.

DAINTY LACES *and* HOW THEY ARE MADE



The well-known "barb and scroll" pattern is shown in this strip of 17th century Venetian needlepoint lace, the scroll being embellished with "barbs," the leaf of the heraldic rose. Floral patterns were developed later than the typical scroll designs.

LACE. At the Paris Exhibition in 1867 was a dress of filmy lace which was valued at \$17,000. To make the cobwebby fabric of this dress 40 women toiled for seven years. And the French Empress Eugenie received a lace flounce as a wedding gift on which 36 women had worked 18 months.

These are examples of the extreme costliness of lace, and the painstaking toil required in its making before the invention and perfection of lace-making machines, which have made possible the mammoth lace industry of today. On these machines many thousands of yards of lace can be woven in less time than a half hundred workers can make a few inches of hand-made lace of the same pattern. Some of these machine-made laces are so exquisite in beauty of design and perfection of finish that it is difficult even for experts to distinguish them from hand-made laces.

The lace-making machine is one of the marvels of the commercial world. Imagine a machine carrying on its reels, which are set one above the other, fine threads set so close together that a silver quarter can just pass edgewise between them. The power is thrown on, and shining little flattened bobbins dance in and out between the close-set threads. Sometimes they dart swiftly over one thread and under the next; sometimes they stop and vibrate rapidly a fraction of a second before they go on. This vibrating movement twists sometimes the warp threads fastened to the reels and sometimes the bobbin threads, and the patterns are made by these twisted threads. Combs quickly press down through the threads to the completed pattern to make it more compact, and more quickly still are up and out of the way. Sixty pieces of lace are often made simultaneously.

The History of Lace-Making

As in the case of so many other labor-saving machines, the development of the lace machine to its present perfection was a slow process. Away back in 1760 a stocking weaver of Nottingham, examining the lace on his wife's cap, believed he could make a similar fabric on his stocking machine, and he did produce an open weave fabric which, however, was a knitted fabric made of one thread passing from one end of the frame to the other, and which unravelled if the thread broke. This was improved by the invention of the bobbin net machine in 1809, so called because the threads were wound on bobbins. Later, flowered lace was produced by machines which used the pattern-weaving device perfected by J. M. Jaquard in 1804 (see Spinning and Weaving). Nearly every design and

mesh of hand-made lace has been mechanically produced. Europe's machine lace industry centers in Paris, Lyons, Calais, Saint Gall, Nottingham, and Plauen, and the United States makes a large quantity.

Hand-made laces are still made all over the world, but their production in quantities for commerce is confined to China, France, Belgium, Ireland, Italy, and England. Because of the infinite care and pains and the great amount of time that needs to be taken in its production, hand-made lace will always remain one of the dearest articles of commerce. Some hand-made laces, it is true, are produced more easily and cheaply than the delicate finely wrought designs that take years to produce.

How Lace is Made by Hand

Hand-made lace is of two types—needlepoint and bobbin or pillow lace. Needlepoint is made with a needle and a single thread. The pattern drawn on parchment is stitched to a piece of heavy linen for the purpose of holding it straight. Threads, sometimes three or four in number, are laid on the many lines of the pattern, and are lightly fastened through to the linen. The entire figure is then worked, filling and open work, mesh by mesh, and when it is completed the stitches holding it to the linen are cut and the lace comes free.

In bobbin lace, the design is drawn off on stiff parchment which is carefully stretched over a "pillow," a round or oval board stuffed to form a cushion, and placed on the knees of the worker. The pattern is picked out along the outline of the drawing, and small pins are stuck in at close intervals. Around these pins threads wound on bobbins of varying size are twisted and crossed to form the various meshes and openings. The pattern or "gimp" is formed by interweaving a much thicker thread. Needlepoint lace is the heavier lace, and has the appearance of greater strength, but pillow lace is very supple and is prized for the way it can be draped.

It is hard to say when and how lace had its origin, but it is generally agreed that lace, as we understand it today, was first made when Europe, emerging from the severe and formal Middle Ages, began to bedeck itself in a graceful and beautiful manner, although specimens of woven fabrics of lacelike character have been found in the ancient tombs.

During the first two centuries of lace-making men used more lace on their dress than women. It was used for ruffs, cuffs, collars, scarfs, and cravats, and ruffles of lace at the top of heavy boots were not

TWO BEAUTIFUL SPECIMENS OF OLD LACE



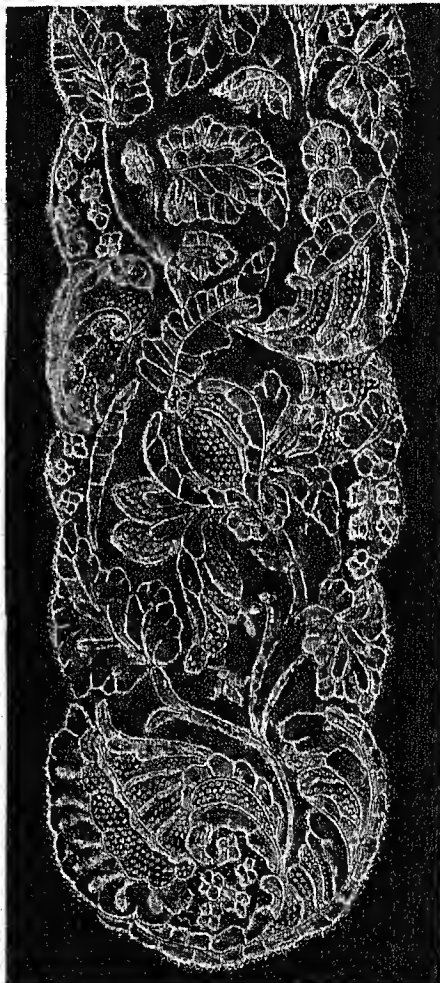
unusual. The most famous laces of this early time were those of Venice, Milan, and Genoa. Venice was celebrated for her points, and Genoa and Milan produced almost exclusively pillow laces. Such lace as was woven in the 16th and 17th centuries cannot be made in a commercial way today. Time is lacking and also the great skill that comes only through years of constant practice. The modern hand-made lace is often more artistic in design, but it cannot be compared with the old pieces preserved in libraries and museums in fineness of execution and thread.

As the industry developed and spread in those early days, the workers became more expert and artistic, and broke away from the stiff geometrical designs which mark the early laces. The various towns of Italy, France, Belgium, Spain, and elsewhere sought to make a product of exclusive pattern that would gain them prestige in the few great centers of commerce of that day. This explains the various names that were given to types of laces: hundreds of years ago, and still persist.

Some of the better known hand-made laces are:

Alençon. A fine needlepoint lace named from the town in which it was first made. It has a closeness, firmness, and evenness not found in any other point lace. It was point d'Alençon, decorated with the bee motif, in which the magnificent cradle of the King of Rome was draped.

Antwerp. A pillow lace whose chief characteristic is the representation of a pot or vase of flowers with which it is always decorated.



The upper strip is an old specimen of the style known as "Point de Burano," while the stole is of Brussels point, sometimes called English point.

Blonde Lace. So-called because being made from raw silk, it was "fair," not white, in color. First made at Chantilly.

Bride. Lace whose ground is wholly composed of bars, without a net foundation.

Brussels. Best known variety is an application lace—a lace made by sewing completed patterns on a machine made net.

Chantilly. One of the blonde laces, both in black and white. The ground is very delicate and the pattern is in light or open work design instead of solid. Chantilly is used in making the mantilla.

Cluny. A plaited lace made in silk, linen, or cotton. The patterns are generally of antique or quaint description, mostly birds, animals, or flowers.

Crochet. Lace made with a crochet hook or whose pattern is so made and applied on net. Similar to needlepoint, but not equal in fineness to the best examples of the latter.

Filet Lace. A darned net lace which is one of the most widely used of the laces.

Irish. Chiefly a point lace made at Limerick entirely by the needle with very small meshes.

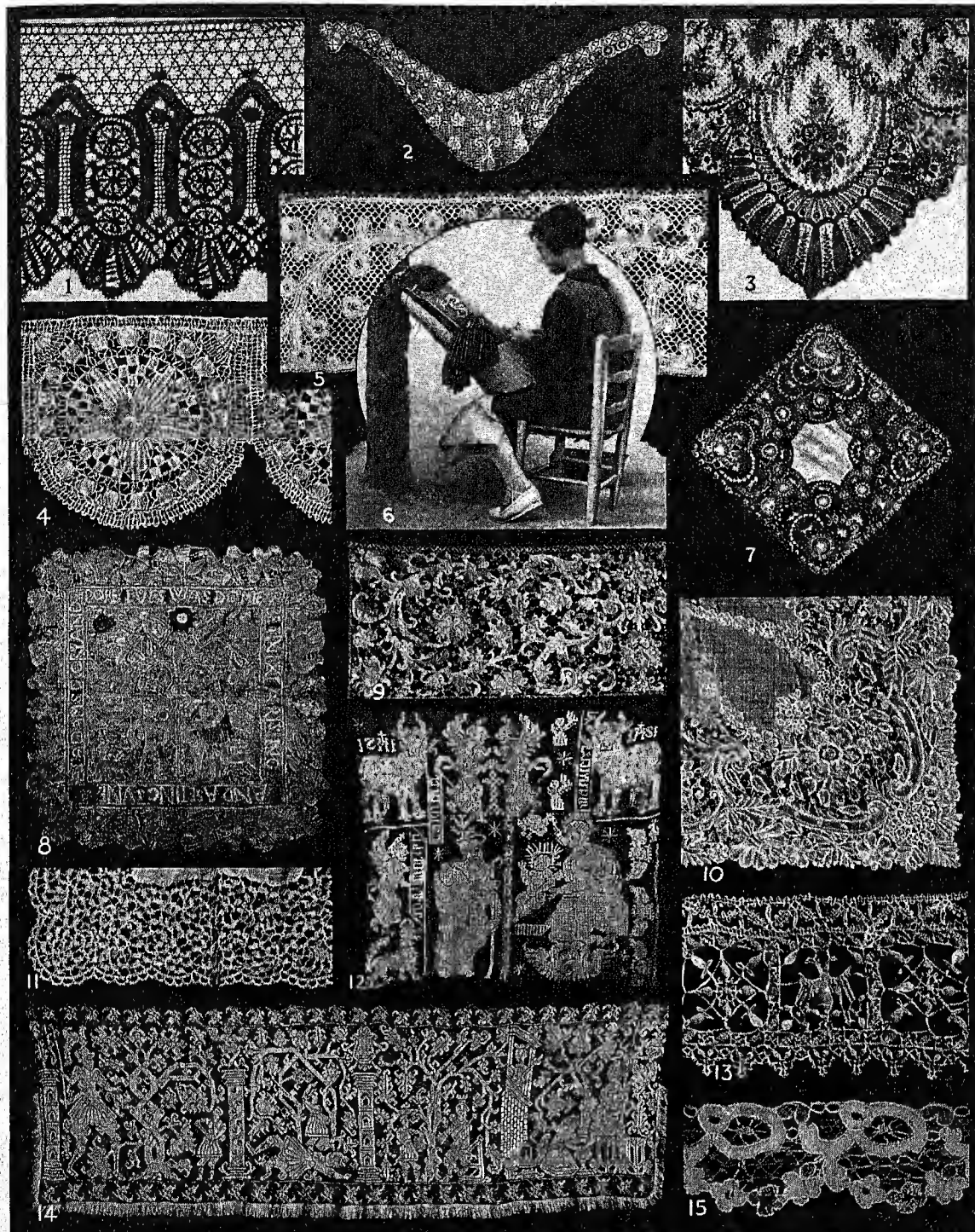
Macramé. A knotted lace made by tying short ends of thread either in horizontal or perpendicular lines and interweaving the knots so as to form a geometrical design.

Oriental. Lace made on embroidery machines. In broad sense, oriental laces refer to the product of the East, especially Chinese, Indian, Japanese, Persian, or Turkish laces. They are all remarkable for their great cost and the originality and boldness of the designs.

Honiton Pillow. Made in Honiton, Devonshire, England, celebrated for the beauty of its figures and sprigs. Queen Victoria's wedding dress was of Honiton and cost \$5,000. Honiton lace veils are treasured heirlooms.

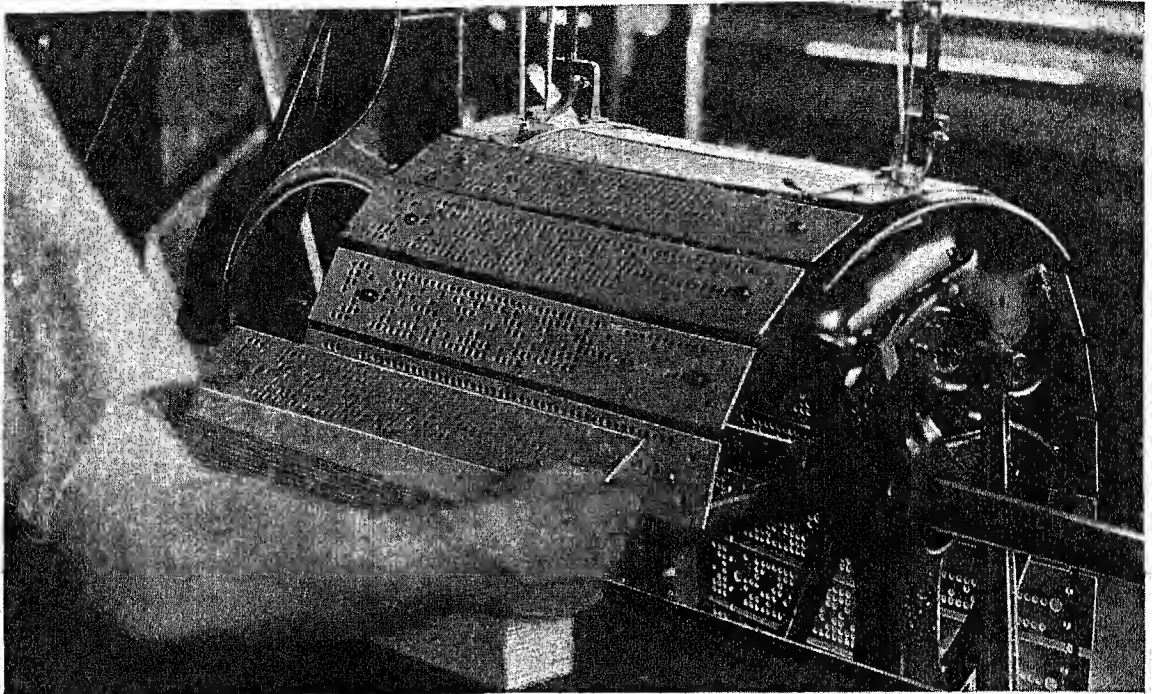
Valenciennes. A solid and durable pillow lace having the same kind of thread throughout for ground and pattern. It is the most beautiful of all French pillow laces, and in early days was also the most expensive.

FIFTEEN FAMOUS TYPES OF HAND-MADE LACE

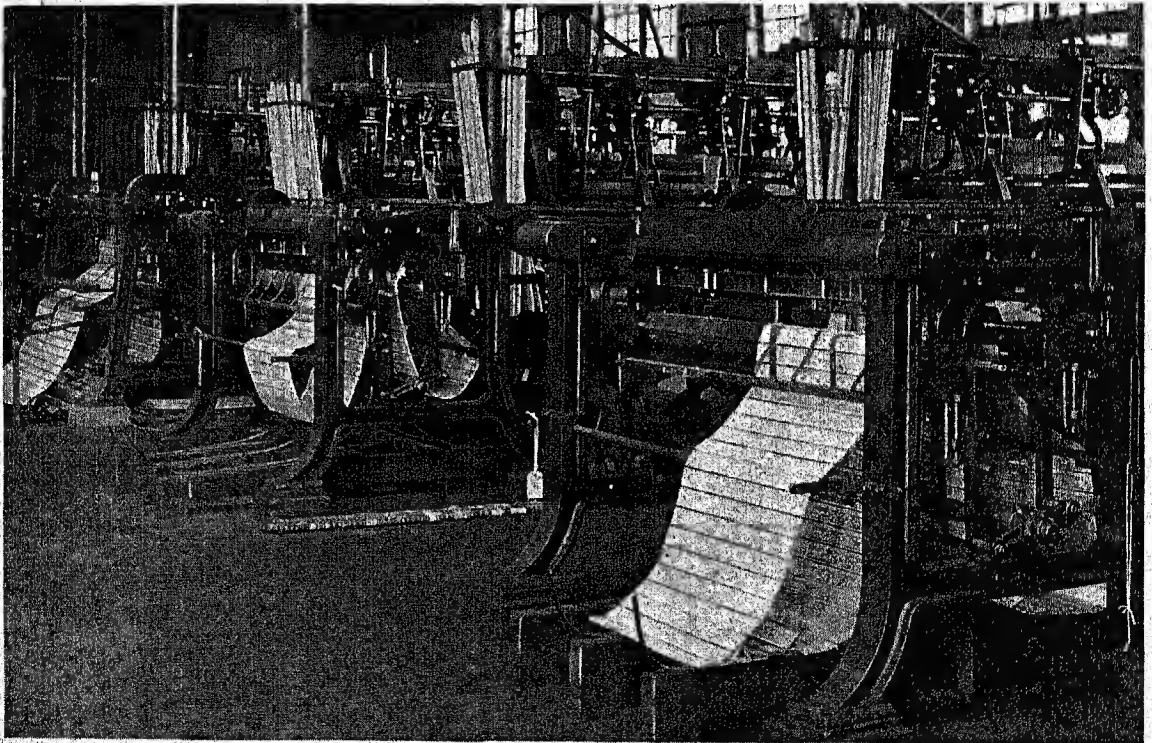


1. This 19th century Saxony guipure in black silk is typical. 2. The Maltese cross characteristic of Maltese lace is seen at the edge of this collar of cream silk. 3. Most delicate of bobbin lace is Chantilly. 4. A drawn-work motif is used in this Mexican lace of alve thread. 5. This bobbin lace of Milan is made as seen in picture 6, showing a girl of Valencia, Spain, at work with bobbins and pillow. 7. Netting, made with a long steel bobbin, adorns this cobwebby handkerchief. 8. English needlepoint, or point d'Angleterre, of the 17th century, forms this bit of church lace showing the temptation of Adam and Eve. 9. Venetian point lace, made with a needle, is the strongest and most beautifully designed of laces. 10. Belgian duchess lace, 19th century, edges this handkerchief. 11. A strip of Irish carrickmacross, or cutwork, lace. It is embroidered linen, cut out and joined with lace stitches. 12. The nativity is shown in German 16th century filet. 13. The double eagle in this 18th century Italian lace is worked with bobbins; the edge is needlepoint. 14. A Spanish altar frontal in filet, early 17th century, tells the story of David and Goliath in four active scenes, with the killing of the giant plainly visible. 15. An interesting design is worked out in German bobbin lace,

GETTING READY FOR THE LACE MAKING

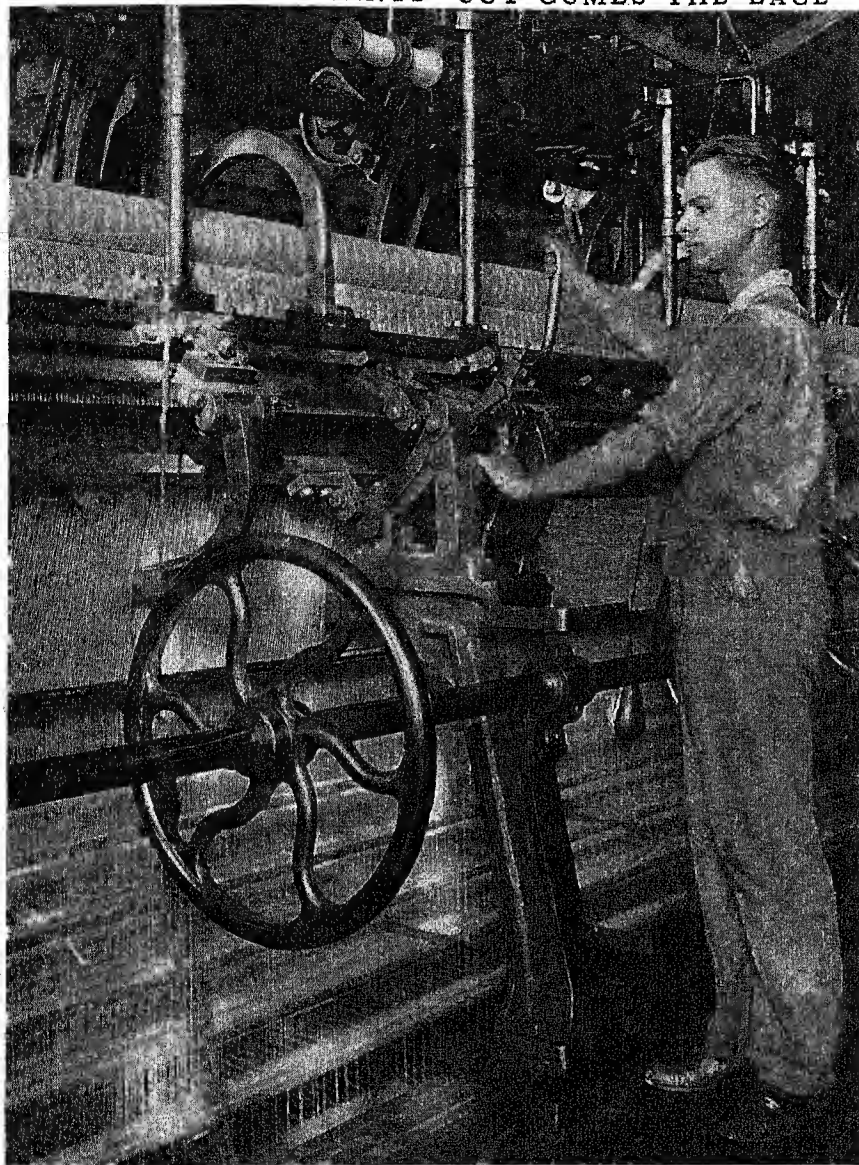


Here a skilled operator is fastening together into an endless chain strips of cardboard which he has punched according to the design furnished him by the lace draftsman. When ready the chain will be run through the lace machine to control its action. Each hole governs a needle in the machine, and the needles, by shifting threads and regulating the tension upon them, produce the pattern.



The chains of white strips are the cardboard "controls," punched and in place ready to regulate the play of needles within the machine. This control is exercised through steel "droppers" which penetrate the holes as they pass by, and which are connected through a complicated mechanism with the needles. You can judge how complex this control is from the fact that in machines such as these there are 32,000 droppers at work, transferring the "messages" of the cards to the threads.

THE MACHINE STARTS—OUT COMES THE LACE



After all the preparations are complete, the power is turned on and the lace commences to appear on the long roller, as you see here. Tiny needles, set like porcupine quills on the roller, catch in the lace and keep it from wrinkling and stretching. When the machine is going, it will produce 60 yards of lace, with a total width of 224 inches, in 60 hours.

LACQUER AND SHELLAC. The shiny black and red finish we see on oriental trays, boxes, cups, and other articles is quite different from the finish we see on most automobiles. Yet both finishes have been called "lacquer finishes." This is because, during the last quarter century, the term "lacquer" has undergone a definite evolution. The original lacquer was made from the sap of the varnish tree (*Rhus vernicifera*). The tree grows abundantly in China where the art of lacquering was discovered more than 3,000 years ago. The oriental process requires 18 or 20 coats of lacquer over paper-covered or cloth-covered wood to get

the hard film desired. Each coat is rubbed with fine charcoal before the next one is brushed on. The Japanese learned to surpass the Chinese in this work, and by the 17th century the oriental art of lacquering became known as "japanning."

In Europe and America the early lacquers were simply spirit varnishes of which shellac is the most common example. These spirit varnishes were used both clear and colored, sometimes on wood but mostly on metals, such as brass, to prevent tarnishing and to give a soft, pleasing luster. Other spirit-soluble gums, such as sandarac and elemi, were often added to the mixture of shellac and alcohol to produce a lacquer which, after many applications, gave a durable and adherent coating to metalwork.

The Modern Synthetic Lacquers

In the years following the first World War, metal finishers and automobile manufacturers began to ask for coatings that would combine high resistance to wear with the fast-drying quality required for mass production methods of manufacturing. Chemists responded to this demand by developing an entirely new kind of lacquer. They added varnish resins to

solutions of nitrocellulose or of cellulose acetate (see Pyroxylin Products). These pyroxylin lacquers dried very quickly with a hard, varnish-like finish.

Later the chemists discovered that many of the new synthetic resins (see Plastics) can be substituted for part or all of the cellulose compounds to give lacquers of still higher quality. For instance, the addition of phenol-formaldehyde resins to cellulose lacquers improves their durability and adhering power. Exceptionally clear lacquers of this new type are made from acrylic resins and vinyl resins. The latter are particularly valuable for coating the inside of cans and

other food containers. Furfural resins, urea and thio-urea resins, and polystyrene are also used in lacquer formulas.

But the most important of the new lacquers are those manufactured from alkyd (glyptal) resins. They were the first to be used on a commercial scale without nitrocellulose. It was found that by allowing the substances which ordinarily produce alkyd resins to react with certain drying oils, quick-drying lacquer was obtained, which hardens by oxidation to an extremely tough and resistant coating. The alkyd lacquers, like most of the other new types, resist the actinic rays of the sun better than the pyroxylin lacquers.

Plasticizers and Solvents

Some lacquers, especially of the nitrocellulose type, require a "plasticizer," which is a substance that makes the coating less brittle and helps the lacquer to flow more easily. The common plasticizers for nitrocellulose lacquers are dibutyl phthalate, tricresyl phosphate, and castor oil. The solvents used for nitrocellulose lacquers are of two classes, the "active" solvent which dissolves the nitrocellulose and the "inactive" solvent which dissolves the varnish-resin. Active solvents are liquids with a penetrating, sweetish odor and include amyl, ethyl, and butyl acetates, while inactive solvents include various alcohols, such as methyl, ethyl, and butyl alcohols. The newer lacquers require less expensive solvents. The alkyd resins are dissolved in toluene or xylene, the vinyl resins in acetone.

Lacquers may be given transparent colors by adding coal-tar dyes. Opaque colors can be produced with any of the pigments used in paints if they are ground in Japan varnish instead of oil (see Paints and Varnishes). These pigmented lacquers are called "lacquer enamels" and are rapidly replacing the older paint enamels.

The Many Uses of Shellac

Shellac makes a smooth, glossy coating when properly applied, and is used on floors and other surfaces where a quick-drying, tough, hard finish is desired. But it does not withstand dampness.

Although it is being rapidly replaced as a coating by the new synthetic resins, shellac continues to be widely used in making phonograph records, as a size or stiffening in felt hats, and as the sealing material that fastens the glass of an electric bulb in its brass base. Toothbrush handles, imitation-ivory toilet articles, billiard balls, and mouthpieces and receivers of telephones contain a portion of shellac. Huge quantities of it are used annually in electrical work, principally as a binder and insulator, and it goes into oilcloth, glue, linoleum, cements, sealing wax,

AFTER A HIGH ONE



Lacrosse players carry the ball on "crosses," or pass it, and the passing keeps the ball in the air much of the time. These girls are leaping for a high pass, to smash it toward the enemy goal.

some inks, shoe dressings, and varnishes for paper and leather.

How Insects Make the Lac Resin

The lac from which shellac is made is a secretion from the bodies of certain reddish scale insects, each smaller than a pinhead. These insects are called lacs (*Tachardia lacca*) from the Hindustani word "lakh," or a hundred thousand, probably because it requires thousands of such insects to produce even a small quantity of shellac. (See Scale Insects.)

In India, Burma, and Siam, the little lac bugs attach themselves to the tender shoots of the fig and certain acacia trees, and suck the sap with their tiny beaks. They give off through their pores a resinous substance which hardens when it strikes the air and forms a protective shell about the lac insect. This substance gathered and refined by the natives is what we call shellac.

The natives cut twigs that are coated with these bumpy shells to a depth of an inch or more, or they scrape off the shells, and in this form lac is called "stick-lac." They break the stick-lac into little pieces with a stone hammer and wash it thoroughly to remove the natural red color.

The lac is now a golden yellow, and native women and children spread it out on a drying mat and walk barefooted through it, turning it over and over in the sun to dry. It is then poured into a narrow, sausage-shaped cloth bag, which is twisted over a charcoal fire until the warm lac is strained through the cloth on the wetted stone floor. There it is stretched into thin strips. Or it may be dropped on the floor in little round cakes and stamped with the maker's initials. In this form it is called "button lac."

Two crops of stick-lac can be harvested each year. The natives induce the insects to spread by tying a few twigs coated with lac eggs to other trees, where the young, upon hatching, immediately shift for themselves and start new colonies.

LACROSSE. Of the games now played in America there is probably none that is so truly American as the game of lacrosse. According to Catlin, an American artist and writer who described the Indians early in the 19th century, this was the favorite game of the most active tribes.

As played by the Indians there were sometimes several hundred persons on a side. The goals were placed half a mile or farther apart, the size of the playing area was almost limitless, and games sometimes lasted for many hours. So keen was the competition at times that the contest became more like a battle than a friendly game. "Baggataway" is what the

Ojibways called the sport. Lacrosse is the name given to it by the French and English colonists who learned the game from the Indians and who revised its rules.

The game soon became popular among white people and was accepted as the national summer game of Canada. It is also played in the United States by schools and colleges, and in England. Women play lacrosse with rules that differ slightly from the men's. The game demands great speed, endurance, and skill.

Lacrosse is played with a rubber sponge ball, $7\frac{3}{4}$ to 8 inches in circumference and weighing $4\frac{1}{2}$ to 5 ounces, and a "crosse" in the hands of each player. The crosse is a wooden stick of any length that suits the player. It has a bent end 12 inches wide, from which a netting of catgut is stretched to the main shaft. The playing field is 90 yards long and 70 to 85 yards wide. At each end is a goal 6 feet square with upright poles to which is fastened a pyramid-shaped net. The object of the game is to bat the ball into the opponents' goal. There are 10 men on a team—a goal keeper who defends the goal; "point," first man from goal; "cover point" in front of point; first and second defense; center; first and second attack; and "outside home" and "inside home," nearest the opponents' goal. The opposing centers start the game in the center of the field by a play called "facing."

With the stick the ball may be carried, thrown, or passed from one man to another. Opponents may knock the ball out of the stick or "check" a player by running in front of him. Touching the ball or a player with the hand is a foul, except that the goal keeper may bat the ball away with his hand. He may not, however, catch or throw it. If a ball or player goes out of bounds, the ball is given to the opposing team. The game lasts one hour and is divided into quarters.

LADOGA (*lā'dō-gā*), LAKE. No fewer than 70 rivers pour their icy waters into Lake Ladoga, Europe's largest lake, which lies in northern Russia near the Finnish border. It has an area of 7,000 square miles, about that of Lake Ontario. Navigation is made dangerous by severe storms and by rocks and shoals, so several canals have been dug along its southern shore. Thousands of vessels and rafts pass through these canals yearly, carrying timber, iron, granite, fish, and hay from the northern shores to Leningrad by way of the broad Neva River, through which the lake discharges its surplus waters into the Gulf of Finland. Ladoga is also connected by water with the White Sea. It is icebound for nearly half the year, but is still of great commercial importance to northwestern Russia.

LADY-BUG. The policemen of the insect world are the "lady-bugs" or "lady-birds," which are really beetles. These small bright-colored creatures are familiar inhabitants of every orchard, field, and garden where they are always busy clearing plants and trees of insect pests. For, friendly as they are to man, lady-bugs are like hungry tigers among other insects. (See Scale Insects.)

Perhaps the commonest of this large family in the United States is the red species with two black spots; but among the 150 species are brilliant red ones with black, yellow, or white spots, shining black with red spots, and yellow ones with black or red spots—all arranged in the greatest variety of patterns. Only a very few kinds feed on vegetable food.

When annoyed, lady-bugs defend themselves by ejecting drops of an acrid and ill-smelling liquid from their knee joints. Hence they are distasteful to birds and most other insect-eaters, and, in fact, are preyed upon by almost no other creatures. The eggs are laid under the leaves of plants infested with insect pests, and as soon as the larvae hatch they start out greedily "mopping up" their enemies until the plant is clean. When full grown, the larvae hang by their tails from a leaf and so pass through the pupa stage to adult beetles. Scientific name of the common red lady-bug, *Adalia bipunctata*.

LADYSLIPPER. In May and June our native orchid, the fragrant and lovely ladyslipper, or moccasin flower, blossoms in bogs, thickets, and moist, hilly woods. There are many species and all are native to North America, growing from southern Canada south

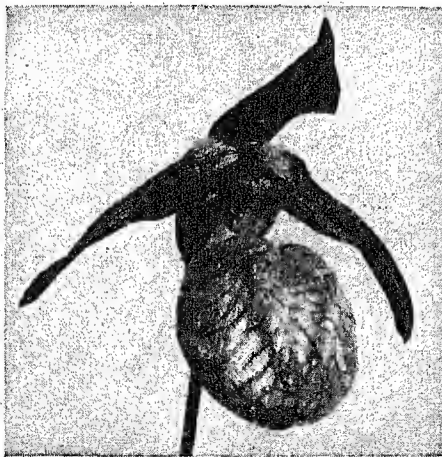
to North Carolina and westward to the Rockies. The blossoms, one or more, are borne on a long, slender stalk. They have a pouch-like lip which helps in the reproduction of the plant. Bees and other insects forcing their way in and out of this pouch carry the pollen from flower to flower.

There are two yellow ladyslippers, one larger than the other. Both have twisted petals of yellowish brown streaked with red or purple. In the larger variety the pouch is deeper yellow. The pink ladyslipper has dark brown or green petals and a rose pouch veined with darker color. The showy ladyslipper, a spectacular species sometimes growing two feet

high, has white petals and a rose and white striped pouch. It is the state flower of Minnesota.

Scientific name of small yellow ladyslipper, *Cypripedium parviflorum*; large yellow ladyslipper is the variety *pubescens* of the same species; pink ladyslipper is *Cypripedium acaule*; showy ladyslipper, *Cypripedium reginae*. Leaves oval, pointed, with riblike veins.

THE PINK LADYSLIPPER



The bulblike part of the flower is the "labellum," or distinctive lower petal characteristic of all orchids, and its slipper-like shape is what gives the flower its name.

A HERO OF *Three* REVOLUTIONS

*The French Nobleman Who Devoted His Life and Fortune to the Ideal of Liberty—
His Services to the Cause of American Independence*

LAFAYETTE, MARQUIS DE (1757-1834). Only the name of Washington among the heroes of the American Revolution ranks above that of Lafayette, the gallant young Frenchman who generously placed his life and his fortune at the disposal of the revolted American colonists. By birth he belonged to one of the old noble families of France. His father had been killed in the battle of Minden, in 1759. The young man, whose family name was Du Motier, inherited from his father a castle and the title of Marquis, and from his mother a princely fortune; and at 16 he was married to a charming young wife, who belonged to one of the greatest families in France.

Three years later, when he was 19 and a captain in the French army, came the news that the American colonies had declared their independence of England, France's ancient foe. "At the first news of this quarrel," Lafayette afterward wrote, "my heart was enrolled in it." So he disobeyed the commands of his king and his angry father-in-law, purchased a ship, and after many difficulties sailed for America. Since he offered to serve without pay, Congress (July 31, 1777) gave him the rank of major-general and placed him under Washington, who soon became a firm friend—almost a father—to the young Frenchman.

Lafayette's services were of inestimable value. He proved a good officer and a wise adviser. He was slightly wounded in his first battle, that of the Brandywine, in September 1777. Next year he was commended for a masterly retreat from Barren Hill and played an honorable part in the battle of Monmouth and in the Rhode Island expedition.

More important, however, was his influence in inducing the French government to sign a treaty of alliance with the colonies, in 1778, without which they



The monument erected in Washington in memory of the great assistance rendered by Lafayette and his companions during the American Revolution.

could not have won the war. To aid this alliance he was back in France in 1779; but he returned to America in time to assist in the Virginia campaign, and in the final movements which led to Cornwallis' surrender at Yorktown in 1781. He then went back to France, loaded with the favors of his adopted country, and was welcomed with every token of appreciation by his sovereign and fellow countrymen.

Lafayette's love for liberty naturally led him to be one of the liberal French noblemen who favored the Revolution of 1789 in his own country. He was elected to the Estates-General, and in that body presented a draft for a Declaration of Rights modeled on the American Declaration of Independence. On the day after the storming of the Bastille, he was made commander-in-chief of the new National Guard, organized to safeguard the Revolution. It was he who proposed for the Revolutionary armies the famous tricolor—the "red, white and blue"—of modern France.

For the next three years Lafayette played a large part in the history of France. He rescued the queen from the mob of Oct. 5, 1789, and issued orders to stop the king when he sought to flee to the hostile armies outside France. But gradually Lafayette became dismayed at the growing excesses of the Revolution. As the head of an army raised to defend France against Austria, he planned to overthrow the Jacobins and support a limited monarchy. He was therefore proclaimed a traitor, and to escape arrest and the guillotine he fled into Belgium, where he was imprisoned by the Austrians. For five years, 1792-97, he there remained in captivity, until his release was obtained by Napoleon.

Lafayette disapproved of the rule of Napoleon, however, and took no part in public affairs until after

his overthrow. Under the restored Bourbons he played no important part until they attempted to restore the old absolutism. Then he led the opposition, and in 1830 took part in his third revolution as Commander of the Army of National Guards that drove Charles X from France, and placed on the throne Louis Philippe, "the citizen-king."

Twice after the close of the American Revolution Lafayette had visited the United States—in 1784 and 1824. On the latter visit, Congress voted him \$200,000 and a township of land. This was a welcome gift, for his own property had been confiscated during the French Revolution. He died at Paris full of honors in 1834. He was not a great general or statesman, but he was a life-long lover of liberty, and played a large part in three great revolutions.

LAGERLÖF (*lä'gër-lûf*), SELMA OTTILIANA LOVISA (1858-1940). The big forests, rough rocks, and merry rivers of southwestern Sweden are poor in wealth, but they are rich in dreams. There, among tales and legends which the centuries have woven like mists about the lakes and valleys, a delicate girl caught these dreams and by them changed the commonplace region into fairyland. With an art all her own, Selma Lagerlöf carries us into far fantastic worlds where through strange eyes we catch glimpses which give daily happenings a meaning we quite miss in the busy work-a-day world. She speaks to both head and heart. Her fancy clothes facts in magic raiment, but never hides them.

To make a school textbook, she called to her aid the elf of Northland myth. Together they seated the boy Nils on the back of Morten Goosey-gander and sent him with the wild geese to learn of the geography, plants, animals, industries, and folk-lore of his country; and 'The Wonderful Adventures of Nils' became a children's classic, translated into seven languages before its tenth birthday.

The life of Selma Lagerlöf had almost the romance she gave to her stories. As a little child she was unable to roam about the picturesque country surrounding the old homestead of Marbacka. But by the fireside she listened to oft-repeated weird tales with which the Northland abounds. When not listening she read, or wrote wild strange stories for her own amusement. At 33 she was an unknown school-teacher. Then her first published book, 'Gösta Berling', brought her swift fame. What the world calls life, she had never known. What it calls doing, she had never done, and yet within 20 years she was known and loved throughout the western world, not alone as the winner of honors rarely bestowed upon women—among others the \$40,000 Nobel prize for literature—nor as one of the foremost women writers of the age, but as a teller of rare fairy tales that are read by young and old alike.

In the United States, her fame came through the publication of her 'Christ Legends' and 'The Wonderful Adventures of Nils', translated by Mrs. Velma Swanston Howard. But her other books have now

become almost equally popular and have all been translated and published in English.

Her works include: 'Gösta Berling' (1891); 'Invisible Links' (1894); 'Miracles of the Anti-Christ' (1897); 'From a Swedish Homestead' (1899); 'The Wonderful Adventures of Nils' (1907); 'The Outcast' (1918); 'Mårbacka, the Tale of a Manor' (1922); 'The Ring of the Löwenskölds' (1931); 'Memories of My Childhood; Further Years at Mårbacka' (1934); 'Diary of Selma Lagerlöf' (1936); 'Jerusalem' (1937).

LAKES. Technically a lake is an inland body of water, larger than a pool or pond, that is surrounded by land. Actually, however, the name is given also to the widened parts of rivers, and to bodies of water which are in direct connection with the sea; while other inland bodies, like the Caspian and Dead seas, are true lakes although not so called. Like Great Salt Lake, these seas are salty because they have no outlet to the ocean, but lose their water by evaporation, which leaves an excessive amount of mineral matter behind. The Caspian Sea is the largest inland body of water in the world, while Lake Superior is the greatest of fresh water lakes.

Lakes are found in any depression of the land surface where there is a sufficient supply of moisture. These depressions may be due to various causes: (1) Hundreds of thousands of lakes owe their origin to the great glaciers which in ancient times filled many river valleys with their deposits, or created new hollows by gouging out rock or distributing their debris unequally. It is owing to glacial action that North America has larger and more numerous lakes than any other continent. (2) Many lakes are formed by obstructions in river channels caused by lava flows, land slides, the operations of the beaver, or tributaries that bring down sediment which blocks the main stream and forms a lake. The abandoned "meanders" or windings of a river often become the sites of lakes, and are called "oxbow" lakes or bayous. (3) Occasionally the warping of the earth's crust creates depressions, as in the case of Lake Geneva, which was formed by the subsidence of part of the Alps. (4) Sometimes "sink lakes" are formed by the sinking of land due to the washing away of underlying soluble rocks. (5) Lakes are often found also in the craters of inactive volcanoes; thus the deepest fresh-water lake in North America is Crater Lake in Oregon, where the volcano formation is perfectly evident.

Many European lakes, especially in Switzerland and northern Italy, show signs of having been inhabited by prehistoric "lake dwellers," whose houses were built on wooden piles driven into the lake bottom along the shore. Study of the bones, implements, and other remains found in the mud and sands underlying such sites gives us much interesting information of the life of these early peoples who lived 10,000 or more years ago. (See also Physiography, and separate articles under the names of different lakes.)

LAMB, CHARLES (1775-1834). As long as the English language is spoken or read, Charles Lamb will be remembered as one of the most lovable figures in English literature. He was not only the most delight-

ful of essayists, but the cheeriest of companions and the best of friends to a number of other brilliant literary men, and he was one of the bravest spirits that ever lived.

He was born in the heart of London in the Inner Temple, a great rambling old building filled with lawyers' offices and lodgings. His father, whom he described as "a man of incorrigible and losing honesty," was a poor lawyer's clerk. At the age of seven Charles was sent to Christ's Hospital, the famous "Blue-coat" school. Here he met another poor boy who became his lifelong friend—the poet Coleridge. These days are delightfully described in his essay, 'Christ's Hospital Five-and-Thirty Years Ago'. At the age of 17, Lamb became a clerk in the accountant's office in the East India House, where he remained until he retired on a pension 33 years later.

When he was 21 the quiet of his life was broken by a terrible calamity. His sister Mary fell a victim to the insanity that was hereditary in their family, and killed her mother. She was confined in an asylum, where she recovered temporarily, and upon her brother's giving a solemn promise to care for her the rest of her life, she was released. Thenceforth Charles Lamb sacrificed everything for his sister. When her malady recurred, he would take her by the hand and brother and sister would walk mournfully to the asylum. But in the intervals which he called "between the acts," there was much that was cheerful and beautiful in their life. They became famous for their evenings "at home," when the brightest wits of London gathered for talk and laughter and good cheer. Mary Lamb shared in many of her brother's literary labors. They wrote together the 'Tales from Shakespeare' which have given pleasure to so many children.

The 'Essays of Elia'

Although he began his literary career by writing poetry and first won distinction by his literary criticism, Charles Lamb's fame today rests chiefly on the essays written under the name of "Elia." In these essays he has taken the most trivial subjects, chosen apparently at random, and put into them his own whimsical, pathetic, quaintly humorous personality. Whether he writes 'A Chapter on Ears', 'Imperfect Sympathies', 'The Praise of Chimney-Sweepers', 'Old China', or a 'Complaint on the Decay of Beggars', he says something worth while and says it in his own inimitable way. Probably no essay in the English language has aroused more laughter than his 'Dissertation on Roast Pig', and none is more full of pathos than his beautiful 'Dream Children'. Lamb's style has an old-fashioned flavor—described by himself as a "self-pleasing quaintness"—due to his partiality for the older writers.

In addition to the 'Essays of Elia', Lamb's most important prose works include the critical notes in his 'Specimens of English Dramatic Poets who Lived about the time of Shakespeare', 'The Adventures of Ulysses', and his romance 'Rosamund Gray'. His best known poem is 'The Old Familiar Faces'.

LAMPREY. There are gruesome stories that in the days of the Roman Empire wealthy masters sometimes punished their slaves by chopping them up and feeding them to lampreys in their fish ponds. Actually the lamprey was little esteemed in those days and the real villain of these stories was the Roman eel, a species of moray. Rich epicures of the time kept them alive in special ponds where they were carefully fattened for the banquet table.

As far as the lamprey himself is concerned, the slave story does him no injustice. These eel-like fish, which inhabit today almost all oceans, seas, and rivers, fasten themselves with their cup-shaped mouths to other fish and suck their blood. Salmon and shad are sometimes caught with lampreys attached to them, and much damage is done among valuable food fishes in this way. In return, the lampreys are taken in large numbers to be used as bait for cod and turbot.

The sea lampreys reach a length of three feet. They are still eaten to a great extent in Europe, and in lesser quantities in the United States; but their flesh is not easily digestible. King Henry I of England is said to have died from indigestion caused by lampreys, which were his favorite dish. The river lampreys found in the upper Mississippi valley and the Great Lakes are rarely much more than 12 inches long. When not attached to other fish, lampreys fasten themselves to stones or sunken logs to rest. Their skeleton is of gristle and for this reason they are classed among the lower fish families. Scientific name of sea lamprey, *Petromyzon marinus*; American river lamprey, *Ichthyomyzon concolor*. (See Fish.)

LAMPS AND LIGHTING. Torches and camp fires gave man his first way to light the darkness, and are today the only light of some primitive peoples. The Shetland Islanders used to make a torch by sticking a wick in the throat of a fat storm-petrel, and the Indians of the North Pacific coast made similar use of a little dried fat smelt called the candle-fish. The lamp of the cave dweller, by the light of which he scratched strange drawings on the cave walls, was made of an animal's skull, a sea-shell, or a hollowed stone. With a rude wick of moss, vegetable fiber, or rushes it burned animal fat or fish oil. This type of lamp the Eskimos and some Laplanders use today.

Lamps of Long Ago

Many well-wrought terra cotta lamps have been found in long-buried cities in Mesopotamia, some dating to 7000 or 8000 B.C. The oldest known metal lamps, made of bronze by prehistoric lake dwellers, have been found in Swiss lakes. The traditional "lamp of learning" of ancient Greece and Rome, was a shallow round or oval dish, of terra cotta or metal, with a handle at one end and a spout for a cloth or tow wick at the other. As skill increased, the potters made ornamented terra cotta lamps with solid tops.

Lamps of much the same shape, called "Betty lamps," came with the Puritans on the *Mayflower*. Of Dutch origin, they were made first of iron, then of tin or brass. Benjamin Franklin is said to have

improved lamps by placing two wicks close together to give brighter light and less smoke, and by using flat wicks made of loosely braided cotton.

In the 18th century, Aimé Argand, a Swiss chemist, revolutionized lamps by placing a flat wick around a hollow tube, allowing air to reach the center of the flame. With more air and a better draft, the flame burned more carbon and gave less smoke. By adding a glass chimney Argand made the lamp completely smokeless. He was

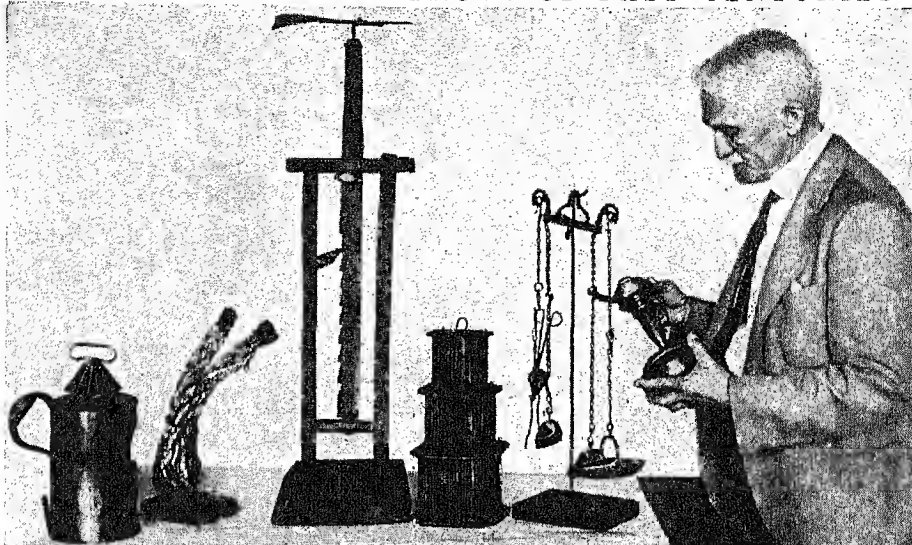
granted a French patent on this improvement in 1784.

Best known of the many modified Argand lamps are the Rochester and the "student's lamp." The former has the oil reservoir below the burner; the latter has the oil in a raised tank flowing by gravity to the wick.

Until about 1845 lamps burned animal fats, whale, fish, and vegetable oils. Whale oil was burned in the lanterns of lighthouses. Camphene, made from turpentine, was among the first substitutes for animal oils, but its tendency to explode kept it from coming into general use. Kerosene, safe and cheap, came into general use about 1860. It was called coal oil, mineral oil, paraffin oil and petroleum oil. (See Petroleum.)

Lanterns, portable lamps to be carried in the

CRUDE LIGHTING METHODS OF PAST CENTURIES



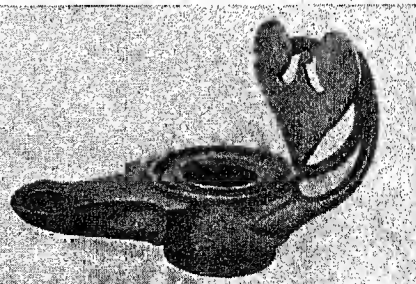
Six old-style ways of lighting the dark are shown above, from a collection in the Smithsonian Institution. At left is a copper lantern of Revolutionary War days, with a panel of horn to emit light. Next comes a Spanish rosin torch, used in the Middle Ages. Third is a Finnish splint holder, in which a piece of splint burned to light a home of the Iron Age. Fourth is a firefly lantern used in the West Indies a century ago. The lamp beam with its four chains and boat-shaped lamp is 900 years old. In the scientist's hands is a lamp of 18th-century England.

wind, were used in ancient times at the head of marching armies, in religious rites, and by soothsayers in their auguries. Before the introduction of the glass chimney, a lantern was usually a candle shielded by a metal guard with holes cut through to shed light. In the 16th and 17th centuries, horn replaced the metal guard; hence came the term "lanthorn." Later oil-burning lanterns were used, with glass chimneys.

Railroad men still signal at night with oil lanterns as well as electric. The dark lantern, or "bull's-eye," has a round lens to concentrate the light. A sliding shutter may cover the lens.

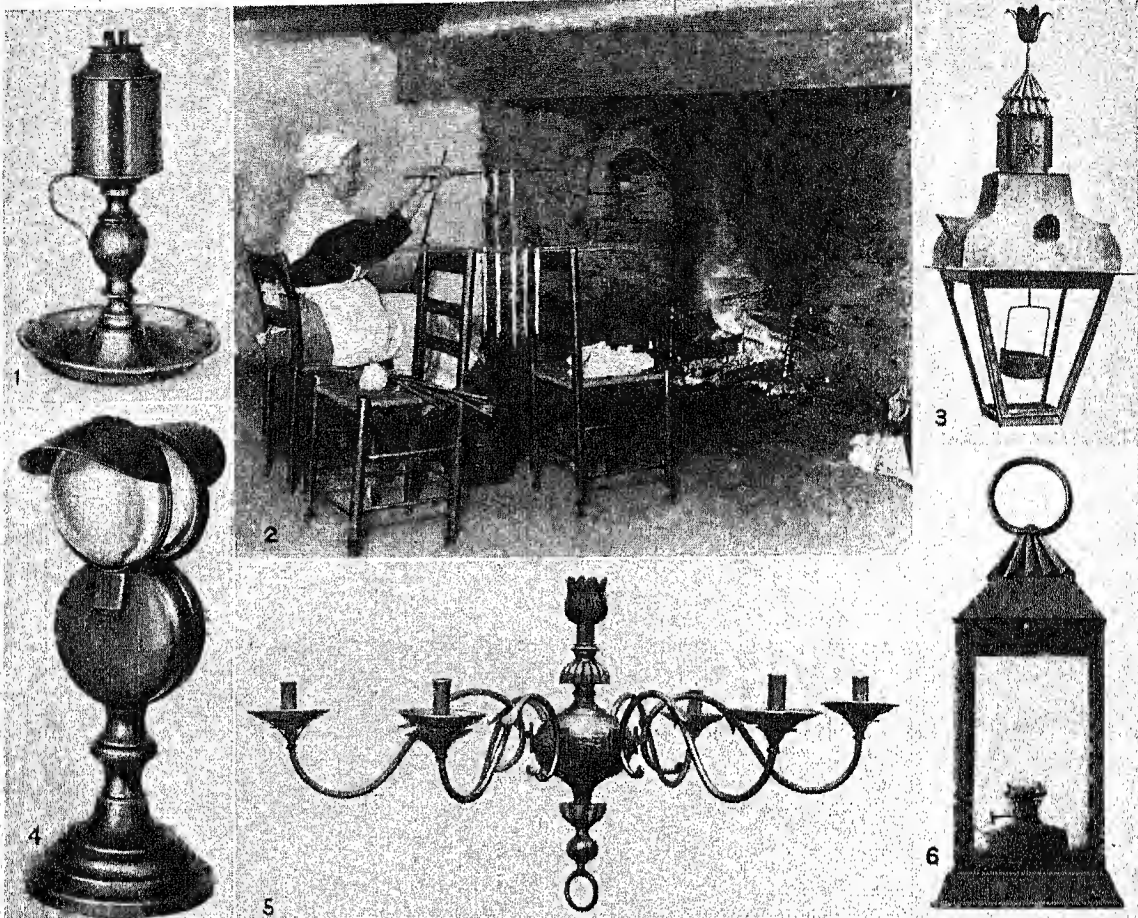
Most used today of all the old lights is the candle. The wax candle probably originated in Phoenicia. The Old Testament mentions candles and candlesticks, but not their materials. Candles of animal fat appeared about the 2d century A.D., and in the 11th century the English made candles by dipping sticks in tallow. Later came candles of spermaceti,

LAMPS OF THE GREEKS AND ROMANS



The flickering oil lamps of Greeks and Romans made up in beauty what they lacked in effectiveness as lights. At left is a Greek lamp on a stand. From the spout projected a wick. The Romans imitated this "lamp of learning." The second picture shows a two-burner Roman lamp, with ram's-head handle, dredged up from the river Thames in England. It is of bronze, as is the third lamp, used in Rome about the first century A.D. Such lamps burn today with olive oil before shrines in Italy.

LIGHTS THAT BURNED IN EARLY AMERICAN HOMES



1. The housewife who owned this double-wick whale-oil lamp in the early 19th century must have burnished its pewter with great pride. 2. Candle-dipping, by which the first colonists laboriously obtained light, is being demonstrated on the hearth of the Elting house, built in New Paltz, N. Y., in 1698. 3. A gracefully designed lantern used in Pennsylvania in the 18th century perhaps once had horn panes to protect the oil-burning lamp. 4. Quite a triumph for its day is this pewter bull's-eye lamp of the early 19th century. 5. Carved in elegant lines is this chandelier of gilt, iron, and wood, which adorned a colonial parlor between 1750 and 1775. 6. This lantern of 1780 has a screw to move the wick. (1, 3, 4, 5, Metropolitan Museum of Art.)

a wax from the heads of whales, and "composites," of stearic acid and stearin, popular about 1830.

The wick of the early candles was only partly used up since it remained in the flame shielded from the oxygen of the air. As a result, the light was soon dimmed. Snuffers, or scissors with a small box on one side, were used to cut away and catch the top of the wick. About 1825, wicks were so woven as to cause the burned portion to fall to one side where oxygen helped to destroy most of it. Later it was discovered that wicks which had been saturated in boric acid burned without leaving any residue.

In American colonial days, candles were made by dipping a wick into hot tallow, allowing it to cool, and re-dipping many times. These "tallow dips" were then thrust into hot water and shaken, to point or "feather" them, and so keep them from dripping. Sometimes they were made in molds.

Rapid modern machinery molds candles in large quantities. Candles today are usually of paraffin, a

refined wax obtained from crude petroleum, strengthened with a mixture of stearic acid (*see* Paraffin). The pleasant light of candles is chiefly used in religious services and to give charm to homes.

The candlestick has long been a handsome ornament. The Greeks and Romans made beautiful candelabra, and in Europe artists wrought fine designs in iron, bronze, and copper for candlesticks. In the 17th and 18th centuries candlesticks of silver, silver plate, and Sheffield plate, as well as of china and glass, glittered on elegant tables.

Brighter light became more available with the introduction of gas in the United States about 1806 (*see* Gas, Manufactured). Its use spread rapidly after the development of the Welsbach mantle, and was only slowly replaced by the incandescent electric lamp.

The first glaring little electric light, hanging from the end of a green cord, was far from lovely. People have since learned how to make electric lighting beautiful. In public buildings, indirect lighting,

produced by bowl-shaped reflectors or opaque globes, diffuses the light and prevents glare.

In the home, each room should be lighted according to its use (*see Interior Decoration*). The living-room is best lighted with several lamps conveniently placed, the dining-room by a chandelier. Kitchen, bathroom, or sewing-room needs special illumination.

Until the introduction of cheap glass for windows, little sunlight found its way into houses; and even after glass became available, windows were few in some countries because a tax was put on them. In medieval times windows in the poorer sort of houses were made of oiled paper. Oiled-paper windows were the rule in the American colonies, because of the scarcity of skilled glassworkers and manufacturing difficulties.

Not only glass, but semi-transparent stone, thin slabs of marble, and shells set in stone frames have served as windows. Pierced stone and grilles of wrought metal have served to admit light while repelling intruders. The first glass windows were probably those of ancient Rome, made of small pieces of glass set in bronze frames. Small-paned windows, with panes joined by strips of lead, were the first glazed windows in Europe because the glassmakers did not know how to make large sheets of glass.

People today understand more clearly the importance of sunlight indoors. Sunlight is the strongest of disinfectants, and only properly-lighted rooms offer efficient working conditions. Architects estimate that the window space in home or office building should be equal to about 20 per cent of the floor space. The modern light, airy house or apartment, with plenty of windows and well-placed electric lights, is a delightful contrast to the dark dens of the "good old days."

LANCASTER. The claim of Henry, Duke of Lancaster, to the English throne was accepted by Parliament in 1399, after Richard II was deposed for misgovernment; and as Henry IV (1399-1413) he became

the first of the Lancastrian dynasty. His hero son Henry V (1413-22), and the latter's weak and incompetent son Henry VI (1422-61), are the only other members of the family who wore the crown. The rival claims of the house of York led to the bloody Wars of the Roses in which the last of the direct line perished (*see Roses, Wars of the*.) Because the Lancastrian

kings owed their throne to Parliament, the power of that body grew greatly in their time.

The English county of Lancaster, from which comes the name of the family, lies in northwestern England, fronting on the Irish Sea. It is now the chief seat of the cotton manufactures of England, and one of its busiest and most populous counties. The county seat, Lancaster, is a town of about 45,000 inhabitants, and has a castle built by John of Gaunt, the father of Henry IV and patron of Chaucer.

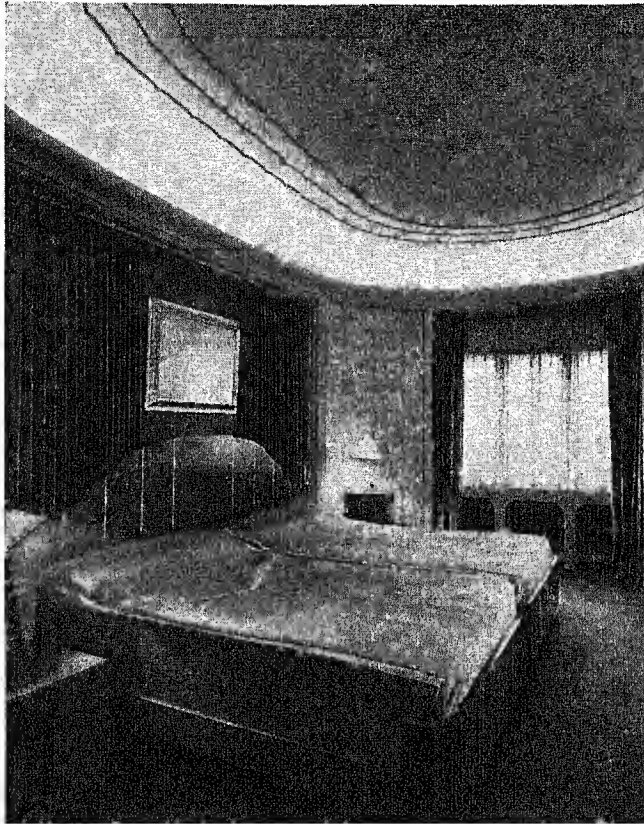
LANDS, PUBLIC At one time or another the United States government has been the "private owner" of about three-quarters of the land within the forty-eight states (1,442,200,320 acres is the exact amount).

This happened be-

cause most additions to the national area consisted of land held principally by Indians. Since among Indians no individual ever "owned" land, the government became owner of the new lands wherever it made treaties by which the Indians surrendered their "hunting rights."

Thus the United States, almost alone among modern nations, had a large portion of a rich continent at its disposal for national purposes. As soon as the Federal government was formed, it began using public lands to promote settlement (*see Northwest Territory*). Land was sold to "land companies" and individuals. Tracts were given to men like Lafayette, who had performed distinguished service. Early in the 19th century the government began giving land to companies in return for agreements to build roads, canals, or railroads. Railroad grants alone amounted to about 207,000 square miles, or about $\frac{1}{16}$ of the national area.

CLEVER LIGHTING IN A MODERN HOME



An ingenious arrangement of electric lights concealed behind a molding gives a soft light throughout this ultramodern room. Two shaded lamps provide centers of interest and avoid the banality which comes from a flood of shadow-banishing light reaching every corner.

Settlers were allowed to "preempt" unoccupied land by a short residence and payment of \$1.25 an acre. In 1862 Congress passed the first Homestead Act. This permitted any citizen over 21 years old or any head of a family to acquire 160 acres of public land by giving legal notice of his intention (called "making entry"), then living upon the land for five years and making certain improvements. Later laws provided for homesteads up to 640 acres in semi-arid regions or where the soil was poor. Former soldiers could count their wartime service as part of the five-year residence period.

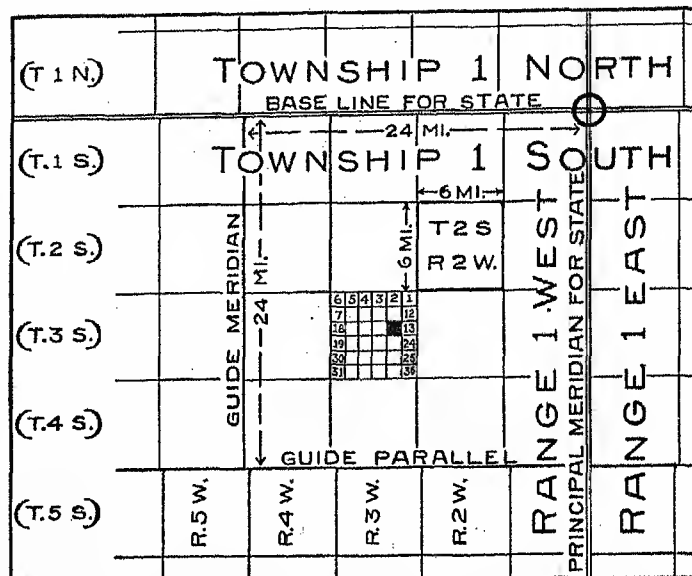
Huge grants were made to states for the support of public education. Until 1850 each new state admitted to the Union usually received $\frac{1}{3}$ of its area for support of public schools, and after 1850, $\frac{1}{4}$. The Morrill Acts of 1862 and 1890 provided grants to states for agricultural colleges (*see* Education).

By 1900 practically all good farming land had passed to state or private ownership. The government still held vast tracts of desert, mineral, and timber land. Under President Theodore Roosevelt a new policy was adopted. Most of the mineral-bearing and forest lands were withdrawn from settlement, so as to conserve these resources for the public benefit (*see* Conservation). This change became complete when President Franklin D. Roosevelt issued orders in 1934 and 1935, withdrawing all public lands within the United States from private entry. This marked the end of the historic land-grant policy under which so much of the United States had been settled. At this time the public domain in the United States proper still amounted to 400,627,235 acres. These lands are now administered chiefly for such purposes as national forests and flood control. The secretary of the interior is empowered to lease grazing, mineral, and recreational rights and to open to entry any areas particularly suited for growing crops.

Most of the public lands are administered by the Department of Agriculture and by the General Land Office of the Department of the Interior. Under the long-established system of surveying, the lands are

laid out into "townships" six miles square; and each of these townships is subdivided into 36 "sections," each containing one square mile, or 640 acres. The sections in turn are subdivided into quarter sections of 160 acres. Certain parallels of latitude are taken as *base lines*, and certain meridians of longitude as *principal meridians*. Townships are described as Nos. 1, 2, 3, etc., north or south of the base line, and in *range* one, two, three, etc., east or west of the principal meridian. A reference to the accompanying diagram will make clear this system of land description, which is used in legal documents to describe land in

HOW A PIECE OF LAND GETS ITS OFFICIAL NAME



Suppose that someone offered to sell you a 40-acre farm and described it like this: "N. E. $\frac{1}{4}$, N. W. $\frac{1}{4}$, Sec. 14, T. 3 S., R. 3 W., Ind."—would you know how to find it? This diagram will show you the secret. In the first place you must read the description backward. To begin with, "Ind." means that it's in Indiana. Now, all states have "Base Lines" and "Principal Meridians" crossing each other, from which all land locations are determined. The next part of the name "R. 3 W.," therefore, means that your land is situated in "Range 3 West" of the Principal Meridian; and the "T. 3 S." means that it is also in "Township 3 South" of the Base Line. Where the third range strip crosses the third township strip is the "Township" which contains your farm. Now each Township is divided into 36 "Sections," each a mile square. "Sec. 14" means that your land is in the 14th Section, the one shown in black. Each section is divided in four "Quarters," and these Quarter-Sections are again subdivided into Quarters. Your farm is the Northeast Quarter (N. E. $\frac{1}{4}$) of the Northwest Quarter (N. W. $\frac{1}{4}$) of Section 14; so it's easy to find it now. Every 24 miles "Guide Parallels" and "Guide Meridians" are surveyed, and those jogs you see in the meridians where they cross the Guide Parallel are to allow for the curvature of the earth.

all states formed out of the public domain.

The legal title of Canadian public lands is vested in the crown, and when the property is spoken of as belonging to the Dominion or a province, it means only that the right to its use or its proceeds has been appropriated to the Dominion or the province, and is under the control of its legislature. Most public land within the provinces is held in this way, but the Dominion itself holds about 937,000,000 acres, or some 42 per cent of the total area, in the Yukon and Northwest Territories. Requirements for obtaining public land vary among the provinces. A common requirement for obtaining agricultural land is residence for three years and payment of a small purchase price. Land bearing valuable timber usually is leased rather than sold. The provincial crown lands amount to about one billion acres. About 33,000,000 acres are in parks and Indian reservations.

Grants of title to land held by homesteaders are sometimes called land patents, because they make public the granting of the title by the government.

LANDSEER, SIR EDWIN HENRY (1802-1873). "Where is my curly-headed dog boy?" the teacher of the Royal Academy school used to ask, when he missed the lad Landseer from his classes. The answer would be "At the Zoo," for this boy divided his time between the two places, and at either was sure to be found studying animals or making pictures of them. Dogs were his favorites, and his first drawing to be engraved and published was of a great St. Bernard. 'Fighting Dogs Getting Wind', was the first of his paintings to bring him fame. His London studio was full of paintings of dogs, big and little, fierce and kind—all so real that visitors would stop at the door and call out, "Landseer, keep your dogs off."

Although he was especially fond of dogs, Landseer loved all animals. Once in Scotland he was taken deer-hunting, and as he and his host lay in ambush a splendid stag appeared. While the host in courtesy waited for Landseer to make the shot, the artist dropped his gun and pulling a pencil

and pad from his pocket began making a sketch of the magnificent animal.

Landseer could draw rapidly and easily. A story is told of how he once drew a stag's head with his right hand, at the same time drawing a horse's head with his left. From boyhood, when at the age of 11 years his drawings won a silver palette from the Society of Arts in London, Landseer's life story is of one success after another. He was early made a member of the Royal Academy; he enjoyed the patronage and friendship of Queen Victoria; he was knighted, and the presidency of the Royal Academy was offered to him.

Of his many dog pictures, 'The Old Shepherd's Chief Mourner' is perhaps the best known. His stags are quite as popular as his dogs, and of these the 'Monarch of the Glen' is a favorite. Besides his pictures of animals Landseer painted many portraits also. His celebrated sculp-

tures of the great lions that stand in Trafalgar Square, London, show equal mastery in this field.

AS LANDSEER SAW HIMSELF



The famed artist painted the original of this picture, showing himself at work with two of his fine dogs watching his labor. Sir Edwin's love for animals was equaled only by his ability to paint them.

RIGHT and WRONG WAYS of Using LAND

LAND USE. Anyone who has even a back yard has to think about land use. Where should the garage go; the coal chute; the clotheslines; the lawn; the rose bed; the vegetable garden? This is a miniature problem in land use that anyone can understand.

Many of us have great-grandfathers who helped to establish towns or took up farms in the Middle West. These men had to settle larger problems in land use. They did so by asking themselves three simple questions about what they proposed to do: (1) How can we do it? (2) Will it pay? and (3) Will we enjoy the result? Scientists speak of these aspects of land use as: (1) the technical or scientific; (2) the economic or business; and (3) the social or human.

In earlier days men thought that if every user of

land were free to answer these questions for himself—to do what he could, what paid him, and what he enjoyed—the problem of land use would work itself out for all of us. But after a century and a half the nation began to realize that something was wrong.

Some Good and Bad Uses of Land

Many millions of acres are not now returning a living to those who own or occupy them. A map of the lands on which taxes have not been paid for a long time will show this; so will a map of relief payments to farmers. These maps would not differ much from the map on the following page showing regions where people are trying to farm land that is better suited to other uses. From this map we can see that the wrong use of land is most marked in three regions. These are

(1) the southeastern states, (2) the Great Plains, and (3) northern Michigan and Wisconsin.

The southeastern region has many good farming districts, such as the beautiful Great Valley of Virginia; but much of the land is too rough and too thinly covered with soil to make good farms. This land was once covered with fine forests, and it ought to be put back to growing trees. The country needs lumber, and the forests would check floods (*see Floods*).

In the Great Plains, where the average rainfall is less than 20 inches a year, most of the land is best suited to cattle grazing. But in many places the ground has been plowed for dry farming. Now, skilful dry farming can be made to pay; but it is a dangerous gamble. If the wrong kind of soil is plowed in the wrong way, it will start to blow and then we have dust storms, drifts, and general destruction. Dry years will produce crop failures. A farmer must have money enough to carry himself over when this happens. Many dry farmers do not. Much of the land they have plowed ought to be put back into grass.

The bad spots in Wisconsin and Michigan are cut-over pine forests; this land cannot be farmed profitably.

Our map also has some bright spots, where the land is properly used. The land of eastern Pennsylvania is rich, and was settled in Colonial days by skilful farmers who have kept it so. Westward from central

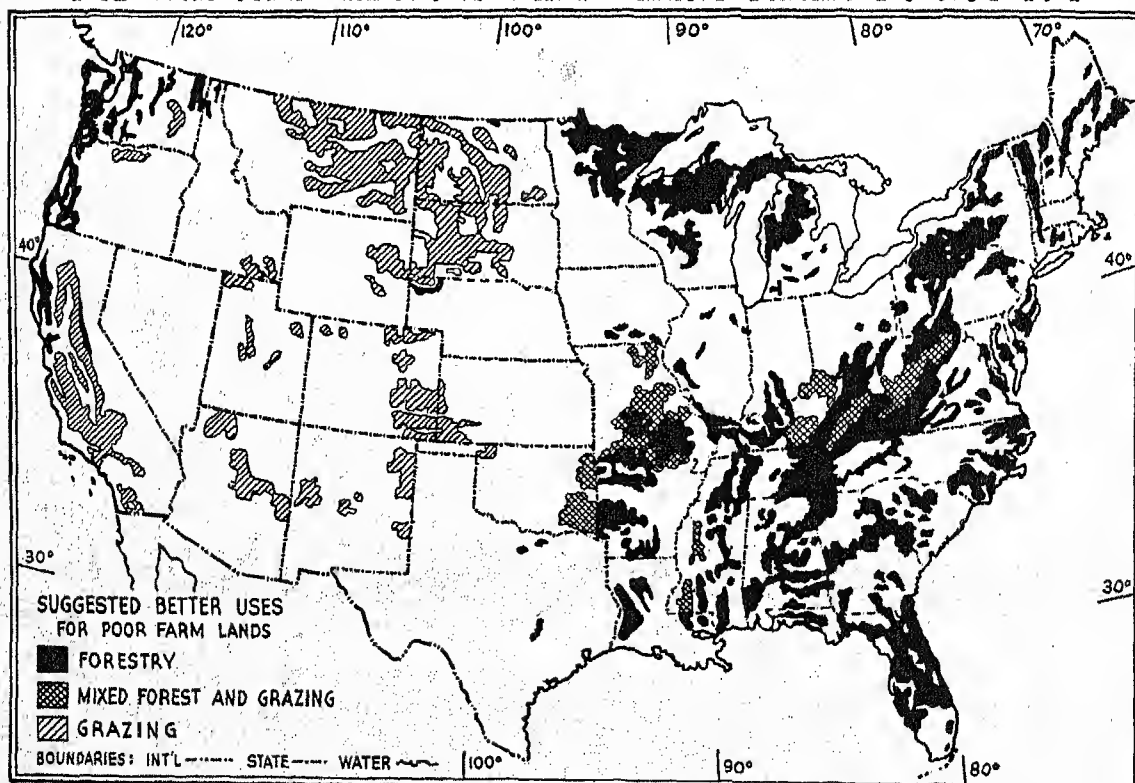
Ohio through eastern Kansas and Nebraska stretches a natural tall-grass prairie, which has the deepest, richest soil in the country. This region, which has in the main been wisely used by good farmers, has become the breadbasket of the nation. So it forms perhaps the largest "white spot" on our map. Many irrigated lands in the Far West also are very productive.

Why should we have these good and bad spots on our map of American farms? The answer lies in what happened when the country was settled.

Mistakes Made by Early Settlers

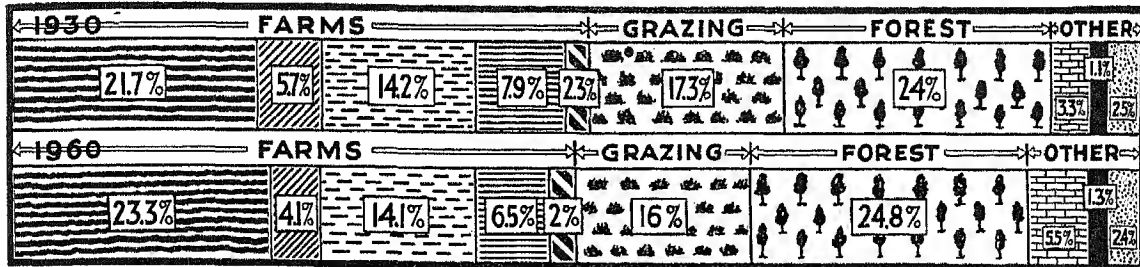
The surveyors who came west before 1800 often indicated in their notes just what use could be made of the land which they examined. But in the rush of settlement not much attention was paid to their reports, and much land was put to uses for which it was not best suited. The situation was made worse by the rapid development of transportation, which gave poor land access to markets, and tempted men to farm it. Many new inventions, also, enabled men to work land intensively, beyond its natural power to produce. For reasons such as these, much land has been exploited rather than used wisely and in moderation. The forests have been largely destroyed, and so has much of the natural grassland. Streams have been silted full of mud, floods have become steadily worse, and the underground water level has dropped greatly since

THE PRINCIPAL REGIONS WHERE MANY FARMS DO NOT PAY



The black and shaded areas show regions where a majority of farmers are unable to earn satisfactory livings, because the land is not suitable for farming. In general, the owners would do better if they used the land as indicated by the key. The map and the recommendations are adapted from a study made by the Land Planning Committee of the National Resources Board.

PRESENT AND FUTURE USES OF UNITED STATES LAND



settlement. The soil itself over the country has suffered a loss of about 30 per cent through being washed away. All of this has seriously reduced the nation's original wealth in land.

Today the United States has a population of roughly 130 million people. To meet the needs of these people, the continental United States has a land area of almost 3 million square miles, about 1,900 million acres. The efforts of the American people to use land profitably have resulted in apportioning the nation's land to different uses as shown in the upper bar graph on this page.

Present Uses and Future Needs for Land

This graph shows that in 1930 nearly 52 per cent of all United States land was in farms, though less than half of this area was crop land. Forests covered about one-fourth of the country; grazing land, used for cattle and sheep, accounted for nearly one-sixth; deserts, cities, and transportation services occupied the rest. Transportation services alone, such as railroads and roads, account for more than 1 per cent of the total.

Now let us see what future needs may be. Studies of birth and death rates indicate that the population of the United States will become fairly stationary about 1960, at between 150 million and 160 million people. To feed this population by present methods, some 443 million acres of crop land will be needed, as shown in the lower graph. This need starts a long chain of essential changes in land use.

Although wise use of land and good farming methods may reduce the need for crop land to some 400 million acres, much of the land now under the plow should be taken out of cultivation. The crop land which will be needed to take its place must be obtained largely by plowing up land now used for pasture. Yet the country will need more pasture than it now has. Perhaps this need can be largely met by restoring grass to poor land which is now being cultivated without profit.

The country also will need more wood than it now produces. To some extent, timber can be grown on poor farm lands. But the timber supply is as much a matter of land management as of land use. If the existing forests were properly managed, they could

probably supply all needs (see Forests and Forest Protection).

Again, cities must have more room for living and recreation, and larger watersheds, or areas where water is obtained and stored in reservoirs. Also, the many people who are leaving the cities for suburban homes, as

transportation facilities improve, will need more land. Roads and streets also will need more land as they are extended and rebuilt to accommodate ever increasing traffic.

How Culture Affects Land Use

In planning how to make these readjustments, the planners must remember always to consider the future—what people will be wanting to do with land 20 or even 50 years from now. For, in the end, the pattern of human activity—often called the culture pattern—largely determines how land will be used.

If a tribe of people lives by hunting or by gathering wild food, ten or more square miles may be needed to support a family, and the plants and animals must be kept in as nearly natural a condition as possible. This was true of the Sioux Indians. But if the same tribe should live by intensive cultivation of irrigated land, one square mile might support hundreds of people, as in Egypt and China. Or a few farmers each working a large area of land might provide food for hundreds of people living in cities. So, too, a small land rich in minerals might support hundreds of people, if they get their food elsewhere. All such possibilities must be considered carefully, with an eye to the future, in any planning for land use.

Choosing and Using Farm Land Wisely

The capacity of land to produce depends upon what is in it. This is clear enough if we are talking about minerals; but it is also true for crops, wild or cultivated. We cannot profitably produce food from the wrong kind of soil.

The kind of soil depends somewhat upon the kind of rock from which the soil was formed. Thus the Atlantic coastal plain is a great place for market gardening, because it is sandy—recent sea bottom; but it requires a great deal of fertilizer. Parts of Kentucky and Kansas are remarkable for pasture, because they are underlain by limestone, which keeps land sweet.

Capacity to produce depends also upon climate, for

climate determines the amount of water, the vegetation, the soil structure, and even to some extent the mineral contents of the soil (*see Soil*). These factors are often difficult to weigh separately; but nature does this for us with her types of natural vegetation. Pine-forest land is likely to be acid and poor in humus; trees which shed their leaves every year usually make better soil. Tall grass is a sign of good water and rich soil; sparse bunch grass suggests that the land might best be used for grazing.

Location and Land Use

Location with reference to markets is another important factor in planning use of land. The accompanying diagram shows how location affects the use of land for farms. The expensive land near big cities is used largely for intensive farming of the more perishable and valuable truck crops. Farther away trucking gives way to dairy farming, this in turn to grain farming, and finally, on the least costly land farthest from the city, we have hay and pasture—the most extensive, least intensive, use of land.

Land values in general vary according to this pattern; and nearness to cities is often more important in determining how the land is used than is the kind of land. For example, if manufacturing or mining draws many people to a certain region and a demand for food arises, farmers can afford to work naturally poor land near by, using fertilizers and perhaps irrigation. On the other hand, naturally good land may hardly be worth farming, because of its location. The "Whiskey Rebellion" in Washington's administration was caused by the fact that farmers in the Pennsylvania hills could not afford to haul their grain to market as grain. Only by changing it to whiskey could they make money; and they therefore resisted the new whiskey tax.

Agencies Interested in Planning

Since 1900 the belief has grown that the man who owns land should not have the right to destroy its value for the future. Instead he should look upon himself as a trustee, charged to pass the land on in as good condition as it came to him. Back of the owner's rights lie the rights of all the people. Freedom should mean freedom to use and enjoy, not to wreck.

Since the United States is a democracy, land-use problems cannot be settled by force. What means do we have to make possible a national program?

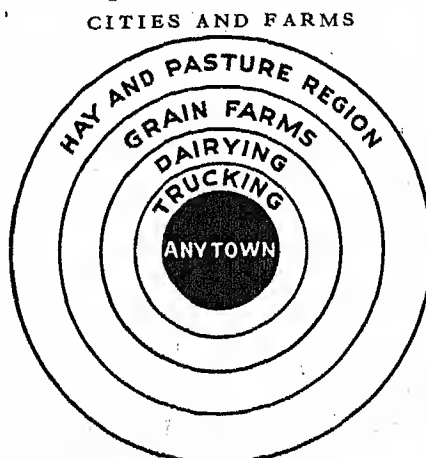
1. *National Planning.* Several government agencies and departments are assisting by collecting information and promoting local efforts. The Agricultural Adjustment measures were designed to encourage proper land use. The Department of the Interior has

withdrawn all public lands from private entry (*see Lands, Public*). The Taylor Grazing Act permits this department to regulate grazing on public land. A model state conservation law drafted by the Department of Agriculture provides a democratic method whereby local districts may adopt land-use regulations, with expert help.

2. *State Planning.* Each state, through a planning board, can cooperate with federal efforts. Wisconsin and Michigan have taken great steps forward in the problem of land use. Many counties in Wisconsin have adopted county zoning plans, which indicate the proper use of land in each county.

3. *Regional Planning.* The states can be divided into a number of more or less natural geographical groups. These groups correspond roughly to groupings used by the national government in handling soil conservation, forestry, and related work. States within these regions can form agreements to cooperate.

4. *Education.* This is the most hopeful means of bringing about wise land use. The United States Commissioner of Education has sponsored public discussion forums and has developed material on land use and conservation for schools. A flood of books and magazine articles is rousing popular interest.



From any great city, the use of farm land tends to change with distance, as the chart shows. (After a diagram by Dr. A. E. Waller.)

Foreign Examples of Land Planning

Abroad, there are three outstanding instances of scientific planning. The dictators of Italy and Russia, having ample power and good scientific advisers at hand, are putting through national programs for wise land use. The marshes near Rome are being drained for intensive farming, and in Italian colonies the use of land and the qualifications of settlers are subject to strict regulation. The Russian government has extensive plans for the wise use of each part of its great domain. Some signs suggest, however, that Russia may repeat some of the mistakes Americans have made, particularly in practising dry farming too widely. A third great example of modern scientific land use abroad is the work being done by the British Empire in developing unsettled or sparsely settled areas. Here, by the democratic machinery of conference and advice, backed if necessary by stiff legislation, the empire is trying to reduce waste and human suffering. In parts of Africa the effort comes too late. Some tribes have so increased in numbers under British protection that they have overworked their land until soil erosion has set in and caused widespread damage.

Possible Future Changes in Land Use

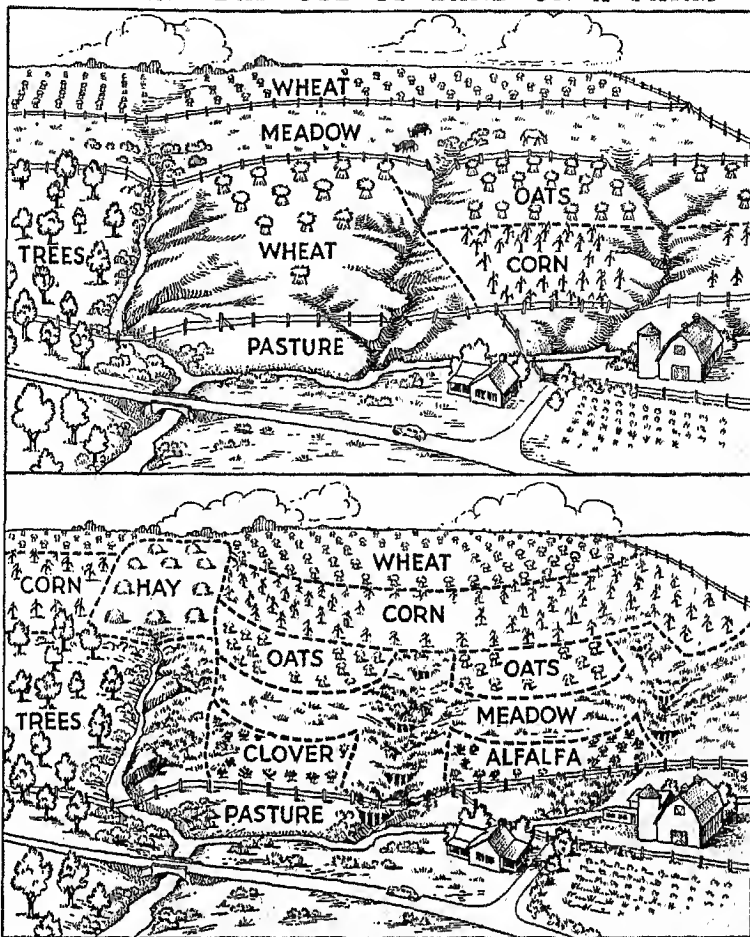
In a world that changes as rapidly as ours, anything may happen. Present plans, however wisely made,

may need revision. For example, how about the use of trailer-homes by people? Will this reduce the amount of land needed for lawns, gardens, and houses? At present most people who own trailers also have other homes, but will they give up such homes in the future? Time alone will tell how the trailer may affect land use.

Another recent invention which may affect land use is *tray agriculture*, or growing plants in great shallow basins of mineral water, without soil or cultivation. Certain vegetables and flowers do well under this method, and for such crops small pieces of land equipped with trays may replace large areas of cultivated land. But for many plants, such as the cereals, tray agriculture has not yet proved commercially successful—it cannot be made to pay for the trouble required. Perhaps some day it may. If so, hundreds of millions of acres will be released for growing trees and for grazing animals. Here again we must wait for time to tell the story.

Again, the nation is steadily consuming its mineral fuels, coal and oil. In time this will make heating more expensive during the long northern winters and turn the thoughts of people southward. The southward trend will be reinforced by the steady shift of rich soil from the fan-shaped upper region of the Mississippi Valley to the river's lower valley and delta. Thus in the distant future the center of population, with all the resulting changes in land uses, may shift

GOOD AND BAD USE OF LAND ON A FARM



One great help in preserving farms for their owners and for the future is stopping erosion by proper use of the land. In the upper picture, a farm was being eroded because the land had been cultivated regardless of slope. Below, rearrangement of the fields and cultivation along the contours, or level lines, are saving the land.

toward that great and fertile center, the lower Mississippi Valley, as it has shifted in Africa to the mouth of the Nile, and in Asia into the great river deltas.

HUMANITY'S RECORD in its LANGUAGES and LITERATURES

LANGUAGE AND LITERATURE. We know little of how the first words grew, whether people imitated sounds of water and wind and beasts, or by what means they assigned a certain significance to an uttered sound. But, like many things that man has made, language has grown with the human race, changed with its history, its tastes, and its fancies, and accurately reflected the image of the people who made and used it. Primitive people, with vague minds, have a simple, blunt tool of language. A crude, dull person uses a language of the same quality as his mind. Clever races, with quick, keen minds, develop a language of subtlety and sharpness.

Languages live, grow, and die, as do people. They record the march of history. The conquering Romans

spread their speech throughout their empire, so that it lives today in French, Italian, Spanish, Portuguese, and Rumanian. Many a foreigner today twists his tongue around the strange and difficult language of the English because those pushful people have spread their control far abroad. Americans speak English rather than French or Spanish, because the vast majority of the colonists who settled North America came from the British Isles.

In a world tied ever more tightly together by railroads, airplanes, steamships, cables, telegraphs, and telephones, language barriers between peoples become an increasing nuisance. People have tried to create artificial languages, easy to learn, without the cranky ways of a natural tongue, for the use of all nations.

But an artificial language, like a wax doll, lacks life and strength and conviction.

All civilized people have made an art of language. Only a great race, producing writers of spiritual depth and possessing a language capable of nuances and harmonies, can produce a great literature. Poems, plays, and tales take on the color of their own age,

just as do architecture and painting. A rough age never produces elegant literature, nor a shallow era anything but trash. Intellectual movements, trends in taste such as classicism, romanticism, and the like, sweep from one country to another in all the arts, like wind over a wheat field. Language and literature are the best record of the growth of human intelligence.

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 - a. Homer: H-329-30. The Trojan War T-142-3; Achilles A-8-9; The Death of Hector H-268-9; Odysseus O-204-8, C-237, C-418-19.
 - b. Other Important Writers: Aesop A-28; Herodotus H-287; Plato P-247; Aristotile A-283-4; Xenophon X-197; Demosthenes D-49; Plutarch P-260; Dramatists and Their Chief Works G-172-3, D-92-3, D-98.
 - E. Latin Literature: L-67-70. Important Writers: Cicero C-235-6, L-68; Caesar C-11-13; Vergil V-284 (Story from the 'Aeneid' T-143-4); Dramatists and Their Chief Works: Plautus L-68, D-93, D-98; Terence L-68, D-93, D-98; Seneca N-64, D-93.
 - F. English Literature: E-283-92. (For a list of well-known English authors and their chief works see E-290.)
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 - c. Shakespeare and the Elizabethan Age: E-284, D-94. The Shakespearean Theater T-76; Ben Jonson J-227; Sir Walter Raleigh R-50; Shakespeare S-94-100h; 'As You Like It' A-322-3; 'Hamlet' H-205-6; 'King Lear' K-22; 'Macbeth' M-3; 'Merchant of Venice' M-119; 'Midsummer Night's Dream' M-162; 'Othello' O-253-4; 'Romeo and Juliet' R-146; 'The Tempest' T-44; 'Winter's Tale' W-118-19.
 - d. Later Poets: John Milton M-176-80; John Dryden D-115; Joseph Addison A-18; Alexander Pope P-303; Oliver Goldsmith G-115-16; William Cowper C-386-7; William Blake B-155; Robert Burns B-279-80; Sir Walter Scott S-48-51; Samuel Taylor Coleridge C-299-300; William Wordsworth W-146; Lord George Gordon Byron B-289; Percy Bysshe Shelley S-110; John Keats K-8; Elizabeth Barrett Browning B-250; Robert Browning B-251-2; Alfred Tennyson T-50, T-52; William Morris M-261; Christina Rossetti R-158; Dante Gabriel Rossetti R-158-9; Algernon Charles Swinburne S-346; Rudyard Kipling K-24-5.
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- c. Drama: D-97, 98, 99. Dramatists and Their Chief Works D-98.
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- I. Latin American Literature: L-67s-x. Bartolomé de Las Casas L-67.
- J. Irish Literature: I-131-2. Drama and Dramatists D-98.
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- M. Russian Literature: R-196-8.
- Some Important Writers: Ivan Turgenev T-156-7; Leo Tolstoy T-106. (See also Fact-Index under names of individual authors.)
 - Great Dramatists and Their Chief Works: D-96, 98.
- N. Italian Literature: I-152-3. (For a list of well-known Italian authors and their chief works see I-153.)
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 - The Renaissance: R-73-4. Francesco Petrarca, Giovanni Boccaccio (Fact-Index); Torquato Tasso T-15-16.
 - Great Dramatists and Their Chief Works: D-96, 98.
- O. Spanish Literature: S-235-8. (For a list of well-known Spanish authors and their works see S-237-8.) Miguel de Cervantes Saavedra C-135-6; Vicente Blasco Ibañez I-1.
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- P. Scandinavian Literature: S-36. Hans Christian Andersen (Danish) A-194; Henrik Ibsen (Norwegian) I-2; Bjørnstjerne Bjørnson (Norwegian) B-152; Selma Lagerlöf (Swedish) L-55.
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- VII. WRITING AS AN ART: W-185-9. Rhetoric R-92-3; Figures of Speech F-32-3; Letter Writing L-98a-99.
- VIII. THE ART OF CONVERSATION: C-347a-d.

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LANIER', SIDNEY (1842-1881). The South has given great poets to the world, but none greater than Edgar Allan Poe and Sidney Lanier. Both of them suffered from poverty and neglect. But in spite of many troubles, Lanier was always serene and brave. His life was hard; he never really had a chance to express his best.

He was graduated from a small southern college in 1860 at 18, and entered the Confederate army soon after. The years were not spent wholly in fighting; reading, playing the flute, and writing poetry filled in the time. Unfortunately he was taken prisoner on a blockade runner toward the close of the war. His lungs, which had never been strong, were badly infected during his five months in prison. He never

fully recovered his health, and the rest of his life was a series of struggles against tuberculosis. The Baltimore climate seemed to agree with him best. There he became a flutist in the Peabody Symphony Orchestra and a lecturer in English at Johns Hopkins University. These situations helped him to establish several delightful friendships. He brought his wife—formerly Miss Mary Day of Macon, Ga., whom he married in 1867—and family north in 1876, when he wrote his Cantata for the Centennial Exposition.

Music and poetry, as he says, dominated his life and are closely associated. His poetry is melodious because he had a full knowledge of the music of English sounds. His rhythms show great beauty. 'The Song of the Chattahoochee' has often been com-

pared with Tennyson's 'The Brook' and does not suffer by the comparison. He shows his mastery of poetic forms in:

All down the hills of Habersham,
All through the valleys of Hall,
The rushes cried, *Abide, Abide*,
The willful waterweeds held me thrall,
The laving laurel turned my tide,
The ferns and fondling grass said *Stay*,
The dewberry dipped for to work delay,
And the little reeds sighed, *Abide, Abide*,
Here in the hills of Habersham,
Here in the valleys of Hall.

Lanier loved beauty in all forms, but he seemed to have an especial feeling for trees and for marshes. To him a forest was healing, as shown in his work, 'A Ballad of Trees and the Master':

Into the woods my Master went,
Clean forspent, forspent.
Into the woods my Master came,
Forspent with love and shame.
But the olives they were not blind to Him,
The little gray leaves were kind to Him,
The thorn-tree had a mind to Him
When into the woods He came.

As a prose writer he contributed volumes of literary criticism, travel, and children's books.

In an older civilization, Lanier's power might perhaps have found earlier recognition and ampler support. In America after the Civil War he had to struggle along as best he could, making a bare living and stealing time for his verse. The wonder is that he accomplished so much with the obstacles of illness and the pinch of poverty to overcome.

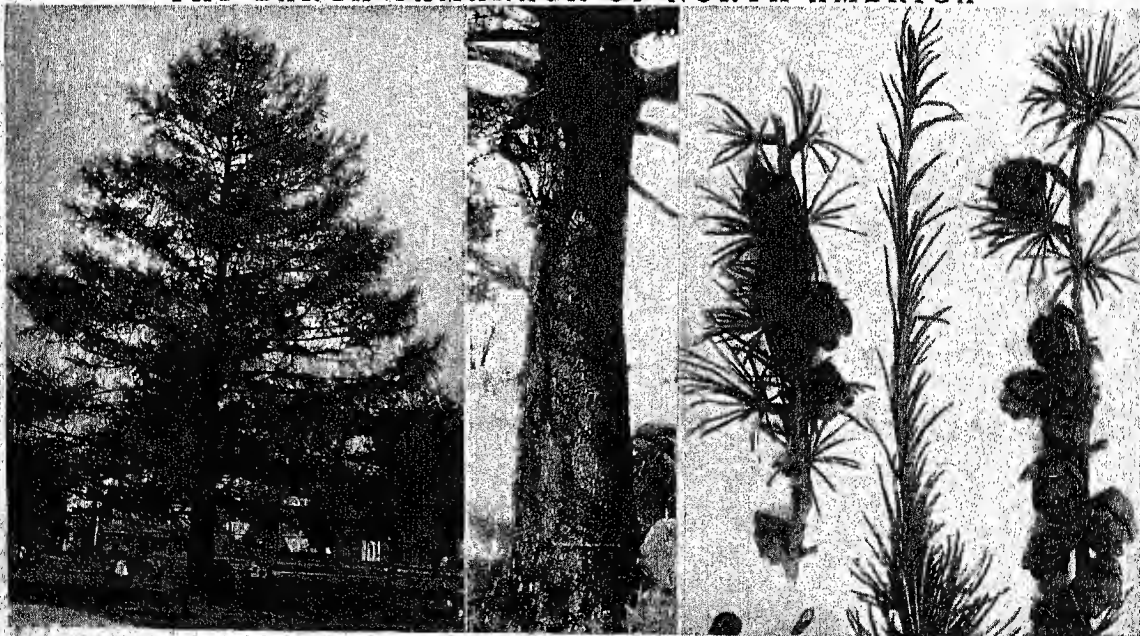
His best known works are: 'Tiger Lilies: A Novel' (1867); 'Poems' (1876, 1884, 1891); 'Florida: Its Scenery, Climate, and History' (1876); 'The Boy's Froissart' (1878); 'The Science of English Verse' (1880).

LAPLAND. If you should visit the frozen lands in the extreme north of Norway, Sweden, Finland, and Russia, on a Sunday you would see black dots come sailing along down the steep slopes of the hills. On closer view they turn out to be squatty bowlegged people, just about five feet high, traveling to church on skis or driving there—sometimes 100 miles—in "pulkas," their queer little reindeer sledges that look like birchbark canoes. These are Lapps, the shortest people in Europe, who live—about 30,000 of them—in a dreary arctic region with a long sunless winter. The region over which they roam is called Lapland, but it has no independent political existence.

The Lapps are of Asiatic origin and speak a language something like that of the Finns. They are an honest healthy contented little people, who wash their flat Mongolian faces only on festive occasions and who live with their dogs in tents or earth-covered huts. Most of them spend their lives in fishing, hunting, and tending their many reindeer that feed on mosses and lichens. A rich Lapp may own perhaps 2,000 reindeer, for these are the people's chief resource, supplying them with meat, milk, and clothing, and furnishing the only means of transportation. There are nearly half a million reindeer in Lapland altogether. The true Lapps lead a semi-nomadic life because of the need of fresh pastures for their herds; pasturage once closely cropped is not used again for some ten years. The fishing Lapps, however, live a more settled life.

LARCH. This tree is peculiar among conifers in that its needle-like leaves are shed each year. There are about eight species of the larch, widely distributed through the northern hemisphere, three of these

THE LARCH TAMARACK OF NORTH AMERICA



At the left is the tree, in the middle its scaly trunk, and at the right its needles and cones.

occurring in North America. The eastern species, called the American tamarack, or hackmatack, grows in the Great Lakes and New England states, and throughout Canada east of the Rocky Mountains as far north as the Arctic Ocean. In its northern range it thrives on well-drained uplands, but in the United States it is found more commonly in swamps. It is a slender, graceful tree, about 60 feet high, with dainty threadlike needles. Longfellow mentions this larch in 'The Song of Hiawatha':

"Give me of your roots, O Tamarack!
Of your fibrous roots, O Larch Tree!
My canoe to bind together
That the water may not enter,
That the river may not wet me."
And the Larch with all its fibers,
Shivered in the air of morning,
Touched his forehead with its tassels,
Said, with one long sigh of sorrow:
"Take them all, O Hiawatha!"

The strong, tough, resinous wood of the larches is used for railroad ties, fence posts, telegraph and telephone poles, and boats.

Scientific name of the tamarack, *Larix laricina*. The western larch, *L. occidentalis*, is a much larger tree, growing to a height of from 100 to 180 feet. This and the small Alpine larch, *L. lyalli*, grow on mountain slopes in a limited area in the northwestern states and in British Columbia. The common European larch, *L. decidua*, is planted in the eastern states for ornamental purposes.

LARK. The skylark is the poet's bird. "On wings of song" he spirals upward until the heavens "melt around his flight." Then, still rapturously singing, he swings in wide circuits back to the nest on the

LARK EGGS



These four eggs of the prairie horned lark are nested cozily in spite of the unseasonable snow which surrounds them.

ground. Larks are primarily birds of the Old World. Only one species, the horned lark, is native to North America. The meadowlark, and the pipit, often called titlark, are not true larks (see Meadowlark; Titlark).

All larks wear modest coats of brown streaked with dark brown or black. The breast is buff, yellow, or white, streaked with brown or black, and the outer tail feathers are white. The horned lark has two black tufts on the top of the head, and black patches on head, cheeks, and throat. Larks nest on the ground in open fields and prairies, where they feed on grain and insects. Their habit of walking instead of hopping distinguishes them from most ground birds. They rarely perch on trees. The beautiful music of the male is usually sung on the wing.

The larks form the family *Alaudidae*. The skylark, *Alauda arvensis*, breeds throughout the British Isles and Europe except the Mediterranean region, migrating in the winter

to northern India, Persia, and Egypt. It has been introduced, but never permanently established, in the United States. On Vancouver Island, British Columbia, however, it has become a resident. Where it is not protected by law it is a favorite cage bird and table delicacy. The horned lark, *Otocoris alpestris*, breeds in the far north of Canada and winters in central and southern United States. The 16 sub-species are widely scattered from coast to coast.

LARKSPUR. The tall blue and purple spires that border garden walls and paths in the spring are better known to gardeners by their generic name *Delphinium*. The Greeks so named the flower because they thought the elongated back sepal resembled a dolphin. This sepal also resembles the rear toe nail of a lark's foot, hence the name "larkspur." The blossoms grow compactly around a stalk from 18 inches to six feet high, which rises above low-growing, decorative leaves. Blue is the predominating color, but there are also shades of purple, white, yellow, pink, and rose. The larkspurs are annual and perennial flowers, native to cool, temperate regions north of the Equator. There are about 150 species, of which some 60 are represented in North America. They form the genus *Delphinium* of the crow-foot family, *Ranunculaceae*.

The annual larkspurs, which grow wild from coast to coast, fall into two general groups—the rocket or spike-like forms, such as *Delphinium ajacis*, and the candleabrum, with a number of short spired heads of different heights, such as *D. consolida*. These are poisonous to cattle. Native to the Mississippi Valley and eastward is the perennial *D. exaltatum*.

Most of the cultivated garden flowers are perennials derived principally from the species *D. grandiflorum*, a native of Siberia; *D. hybridum*, from Asia; *D. formosum*, possibly from Asia Minor, although the origin is doubtful; and *D. exaltatum*. The American Delphinium Society is encouraging the development of new varieties.

Delphiniums should grow in full sunshine, in deep, well-drained, but moisture-retentive soil. They are most vigorous in cool weather. Some bloom only in the spring; others become dormant in hot weather and bloom again in the fall. They are usually propagated from seed, which may be planted early in the spring, if the springs are long and cool; otherwise in late spring or early fall.

A CLUSTER OF BLUE



The buds at the bottom show plainly the spur which gives the plant its name of "larkspur."

LARVA. The word larva is applied to the young of certain animals that must undergo profound changes before they become adults. A young frog hatches from the egg as a water-living tadpole, and gradually becomes transformed into the air-breathing adult. A tadpole is therefore a larva.

Many insects go through a larval stage. This is one way of meeting the difficulty all insects have in growing. The outer covering (exoskeleton) of an adult insect is made of a tough substance (chitin) that cannot stretch or grow bigger. Many insects, like the grasshoppers, acquire such a skin when young, and must shed or molt the skin several times while they are growing. Other insects remain soft-skinned during the growing period, usually with altogether different shapes and habits from those they will have later on. Young insects in this stage are called larvae. Before they are ready for adult life, they pass through another stage, called the pupal stage, in which they get their hard outer skin (*see Pupa*). Insects that go through the four stages of egg, larva, pupa, and adult are said to have complete metamorphosis (*see Insects*).

Many insect larvae have special names. The larvae of beetles are grubs; of flies, maggots; of butterflies and moths, caterpillars. **LA SALLE, RENÉ ROBERT CAVELIER, SIEUR DE (1643-1687).** Young René Cavelier, the son of a rich merchant of Rouen, France, arrived in Montreal, Canada, in 1666 to seek his fortune. When he was killed 21 years later, he was known as the *Sieur de la Salle*, the man who had explored the Mississippi River to the sea, and had given France her claim to the entire Mississippi Valley under the name of Louisiana.

For his start in Canada he got a grant of land at Lachine near Montreal from the Seminary of St. Sulpice, where his older brother was a priest. He worked this land; but he was more interested in Montreal's greatest activity, the fur trade. Every spring hundreds of Indian canoes, led by French agents called *coureurs de bois* ("wood runners"), came to trade bales of furs for trinkets, cloth, firearms, and brandy. For ten days or two weeks Montreal hummed with business and riotous celebrations; then the Indians vanished into the West until the following year.

From these Indians La Salle got the idea that sent him into the wilderness. South of the Great Lakes, the Indians said, a broad river ran southwest to "the Vermilion Sea." La Salle thought that this sea might be the Gulf of California. If so, "the great river" would be a splendid route to China, and by discovering the route La Salle could become rich.

La Salle's First Explorations

By selling his land, La Salle financed two expeditions, one in 1669-70 and another in 1671. On the

first he struck south from Lake Erie for his "southern river." He probably reached the falls of the Ohio, and perhaps the Mississippi; but his records were lost, and no one can say today just where he went.

In 1671 he made a second trip into Lake Michigan, across the Chicago portage to the Des Plaines River, and then down that river and the Illinois for an unknown distance. This expedition gained him nothing; but on his return he found a new governor, Count Frontenac, who thought highly of his ideas (*see Frontenac, Count Louis de*).

A Grand Plan for an Inland Empire

In 1673 Joliet and Father Marquette had explored the Mississippi far enough to prove that the river emptied into the Gulf of Mexico. Frontenac and La Salle at once proposed to build a chain of forts and trading posts along the Great Lakes and the Mississippi to hold the region and its fur trade for France. This protection was needed because the Iroquois Indians were trying to force the fur trade through New York into the hands of their allies, the Dutch and English traders at Albany.

Frontenac had made a start on this plan by building

Fort Frontenac where the St. Lawrence flows out of Lake Ontario (*see Kingston, Ont.*). But the colony could not even maintain this little post properly; so Frontenac and La Salle worked out the idea that La Salle was to be made governor of the West, and given a monopoly of trade in the region. In return, he was to build and maintain the needed forts.

La Salle made two trips to France, in 1674 and 1677, before he got the monopoly and his title of *seigneur*. Meanwhile the long-established traders and Frontenac's enemies did all they could to block him. They even poisoned his food, and they succeeded constantly in placing traitors among his men.

La Salle was ready, however, in 1678. In the winter of 1678-79 an advance party under Cadillac built a fort at the Niagara River and started to build a 40-ton ship, the *Griffon* (*Griffin*, in English). On Aug. 7, 1679, La Salle with his faithful lieutenant, Henri de Tonty, started for Green Bay on the first voyage ever made by a ship on the lakes.

They reached Green Bay in September and sent the ship back laden with furs. Then La Salle followed the route to Lake Peoria shown on the accompanying map. Here, early in 1680, La Salle built Fort Crèvecoeur ("heartbreak"), and sent Father Hennepin with a companion to explore the upper Mississippi.

Leaving Tonty in charge of the new fort, La Salle made a fast trip back to Fort Frontenac, where he found out that the *Griffon* never had been heard from. On his return westward, he learned that the Iroquois had ravaged the country. He found Fort Crèvecoeur in



SIEUR DE LA SALLE
Explorer of the Mississippi

ashes. Tonty and his men had vanished. La Salle traced him northward to Mackinac. The stout veteran had fought his way out through the Green Bay region.

Exploring the Mississippi in 1682

La Salle now spent a year organizing the Illinois Indians to resist the Iroquois; then early in 1682 he followed the Illinois River and the Mississippi to the Gulf of Mexico. On April 9 he named the entire Mississippi Valley Louisiana and claimed it for France. Retracing his steps, he built Fort St. Louis at Starved Rock, Ill., as a rallying point for the Illinois Indians.

In 1683 he returned to civilization, to find that Frontenac had been recalled and his own rights canceled by the new governor. Hewent to France and persuaded Louis XIV to renew his rights and to help him procure four ships and about 400 men for a post at the mouth of the Mississippi River.

The Final Disaster of 1684-87

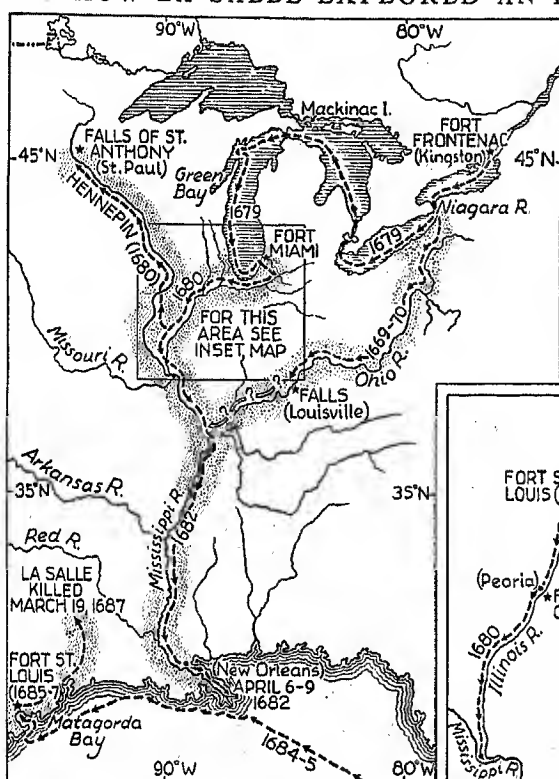
This expedition by sea ruined La Salle. The naval commander, Beaujeu, who had charge of the ships, opposed him constantly. In the West Indies La Salle fell sick. Many men deserted. When he set sail again with only about 180 men, he lost his way. He had not known how to fix the longitude of the Mississippi's mouth at the time he discovered it in 1682, and now he could not choose the right opening among the many bays and bayous. Finally he landed at Matagorda Bay, Tex., where Beaujeu left him with one small ship on Mar. 12, 1685.

La Salle started to build a fort and scouted for the Mississippi. His ship was wrecked, and his men died or were killed until he had only 36 left. Then in January 1687 he took half the men on a desperate overland trip to reach Tonty in Illinois; but on March 19 in north Texas, three of his men shot him.

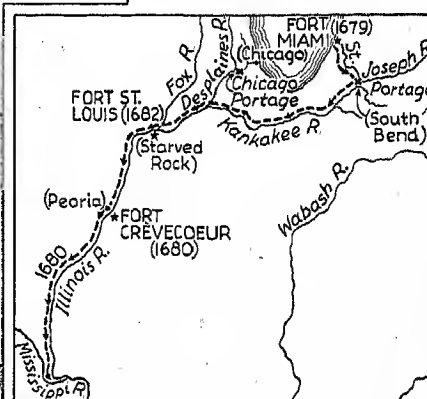
Thus La Salle died seemingly a failure. But he had made monumental discoveries, and a few years later the French built the forts he had planned. These held the inland country for France until England took Canada in 1759 (see French and Indian War).

LAS CASAS, BARTOLOMÉ DE (1474-1566). As soon as the Spaniards settled in the West Indies, their need of laborers for mines and plantations led them to enslave

HOW LA SALLE EXPLORED AN INLAND EMPIRE



This map shows how La Salle spent the last 18 years of his life exploring the Mississippi Valley and trying to set up a chain of forts to control the fur trade for France. Each one of his major exploring trips is shown, except one in 1671. This journey covered the same route as the trip of 1679 as far as Chicago; then it followed the Illinois River for an unknown distance. To help fix locations, the names of a few modern cities nearest the sites of La Salle's forts are given in parentheses. The area of his most intensive work, along the Illinois River, is shown in a separate map on a larger scale. The details of the routes cannot be considered exact, since no definite records of them exist.



the natives. Bitterly hard labor and brutal treatment killed the red men by the hundreds. The first man to interfere in their behalf was Bartolomé de Las Casas, the "apostle of the Indies."

He was a young lawyer in Spain when his father, who had accompanied Columbus on his second voyage, sent him to Hispaniola to manage a newly acquired estate. In 1510 he became a priest, the first to be ordained in the New World, and began his life's work by freeing all the Indians over whom he had control.

When his neighbors refused to follow his example, he journeyed to Spain and obtained from Charles V an order that Indians must be paid for their work unless they were cannibals. He himself was appointed "protector of the Indians." In his zeal for the red men, he advocated the substitution of Negro slaves—a measure he bitterly regretted later on.

In 1523 he entered the Dominican Order and gained the assistance of this powerful organization. In 1530 he won a decree freeing the Indians of Peru. Yet the government made little effort to enforce the new laws. Opposed by numerous enemies, Las Casas retired to Spain in 1547. Before his death he had the satisfaction of seeing the gradual emancipation of the Indians begun. His book, 'A Brief Relation of the Destruction of the Indies', told such gruesome truths regarding the Spaniards' treatment of the red men that for more than 300 years it remained unpublished.

The STIRRING Panorama of LATIN AMERICA



Latin America is a mixture of ultra-modern civilization and of primitive wilderness. Here is a view of one of the world's most beautiful cities—Rio de Janeiro, Brazil's capital. In the foreground is the magnificent Avenida Beira Mar which skirts Flamengo Beach and Botafogo Bay, and leads to famous Sugar Loaf Peak (Pão de Assucar) in the distance.

LATIN AMERICA. Twenty republics make up Latin America. Their lands stretch for more than 6,000 miles from the Rio Grande to Cape Horn. Seven of them—Mexico, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, and Panama—are in North America. Three—Cuba, Haiti, and the Dominican Republic—are in the West Indies. Ten—Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile, Argentina, Uruguay, Paraguay, and Brazil—are in South America.

In certain respects these countries differ greatly. Some are peopled mostly by Indians, others mostly by whites. Brazil speaks Portuguese, Haiti speaks French, and the others speak Spanish.

But in other respects they are much alike. They all fly a republican flag, they are all young and vigorous, and they all have their golden age before them.

All are rich in the raw materials and foodstuffs which other nations need to supply their factories and feed their peoples. And all are being attentively eyed by these many nations that want a share in their trade and their markets.

Latin America Commands World Attention

HERE is the greatest uncrowded expanse of fertile land on the globe. Here is room for the swarming populations of Europe and Asia. Argentina alone has room for millions of settlers. It could double its population before it would be as thickly settled as Texas. Here is a wealth of resources that no one can estimate. Brazilian coffee and rubber, Argentine wheat and beef, Chilean nitrate, Bolivian tin, Peruvian copper, Venezuelan

Resemblances and Contrasts Among the Twenty Republics South of the United States; the Character of the People, Their Traditions and Customs, Culture and Future Prospects.

petroleum, Cuban sugar, Cost Rican bananas, Mexican silver—these are just a few items of this wealth. Here are markets for the manufactured goods of other lands. Here are astounding cities. Rio de Janeiro, many visitors believe, is the most beautiful capital in the world. Here are

splendid circles of intellectual leaders, equal in brilliancy if not in numbers to similar groups in Europe and the United States.

It is natural then that Latin Americans should look to the future with boundless hope and should be energetically preparing for it. Brazil spends millions in enlarging and modernizing its capital—hewing down hills and pushing the land farther out into the sea to get more room. Argentina is building up great industries; and its capital, Buenos Aires, at vast cost cuts through the crowded business section to make a thoroughfare 460 feet wide with five roadways separated by strips of park. Chile is building factories and pushing with renewed vigor its pioneer social security program. Uruguay, Venezuela, Cuba, El Salvador, and other countries are energetically working to protect the health of mothers and children. Colombia, cut in two by high mountains, uses the airplane to overcome this barrier to unity. Everywhere one finds the people striving to remove ancient handicaps and to build for a glorious future.

Latin America's potential power is attracting the attention of the world. Trade missions from foreign industrial countries are found in every city of importance. Political, racial, cultural, and religious groups are sending representatives to spread their ideas. The latest literature from France, Germany, Russia

and other countries (but little from the United States) is seen in the libraries and the bookstores. German Nazism, Italian Fascism, and Russian Communism have each developed highly effective propagandas. Great Britain is seeking to extend its commercial influence and Spain its cultural influence. Japan is sending merchants, farmers, and laborers to promote its interests.

The United States, after long neglect, is likewise developing an active program for promoting friendship with the southern countries. It is pushing this program with energy to make up for its past indifference to its southern neighbors and its failure to understand them. Too long the people of the United States have assumed that their country alone was "America."

Who Are the Latin Americans?

WHEN DWIGHT MORROW was selected by President Coolidge in 1927 to go to Mexico as ambassador and try to bring about friendlier relations, he said to himself, "I am going to like the Mexicans." He also began to consider how he could get the Mexicans to like the United States. One of the first things he did when he arrived in Mexico City was to take down the sign "American Embassy" from his new home and put up a brass plate saying "Embassy of the United States of America." That delighted the Mexicans; for they and all the other people of the Western Hemisphere have just as much right and are just as proud to be called Americans as have the people of the United States. Indeed, the name "America" was first applied to South America and the Caribbean area, and not to North America (see America).

Latin America the Early Home of Culture

Another great citizen of the United States, Elihu Root, won the hearts of the Latin Americans by recognizing that their civilization is the oldest in the New World. The occasion was an address before the third Pan American conference at Rio de Janeiro in 1906. When Mr. Root, then secretary of state, announced that he would attend, the Brazilians were overjoyed. They met him at the steamer with bands and flowers and soldiers. That night he was to make the opening speech of the conference. Would he win friends for his

country, which South America was criticizing for sending troops to Panama and Santo Domingo? Or would he increase the fear of the powerful Uncle Sam?

With his opening sentence, he went straight to the hearts of the southern nations: "I bring from my country a special greeting to her elder sisters in the civilization of America." Here was recognition, not only that Latin Americans were Americans, but also that they were leaders in civilization—and that their civilization was older than that of the United States. They quote that speech even today.

Secretary Root was merely paying tribute to the historic fact that Latin American culture goes back four centuries. The first printing press in America was set up in Mexico about 1539, a hundred years before the beginning of printing in the English colonies. The first university was founded in Santo Domingo about 1538. In 1551 two more universities were founded, one in Mexico City and one in Lima. When the first college was started in the English colonies (Harvard, 1636), Latin America already had six universities. In 1585 a literary contest was held in Mexico City in which some 300 poets took part. When the Dutch were trading trinkets to the Indians for Manhattan Island, the city of Asunción in the heart of South America was a well-organized community with schools, churches, and literary clubs.

Significance of the Term "Latin America"

Where did this culture come from? From Europe, and chiefly from the three countries of Europe that derive their language and civilization from the Latin people—Spain, Portugal, and France. That is why these southern Americans have come to be called "Latin Americans." Of course, like many such popular terms, this is not satisfactory to many people. The Spanish, who colonized and gave their language to 18

LATIN AMERICA INCLUDES THOUSANDS OF ISLANDS



Not only are some of the large islands of the West Indies considered as part of Latin America, but also the numerous small coastal islands of Central and South America. This is a scene on one of the San Blas group near the Atlantic entrance to the Panama Canal. Its natives are pure-blooded Indians.

OVER THE ANDES FROM CHILE TO ARGENTINA



Mountain barriers tend to isolate most Latin American nations from their neighbors. Modern airplane transportation is providing new links between them. In many a remote region people who never saw a railroad train are familiar with the latest types of streamlined air transports.

of the 20 countries, would like to have it Hispanic America. But Brazilians, who speak Portuguese, and Haitians, who speak French, object to that. And it cannot be denied that the Latin way of looking at life dominates the peoples of the south, just as the Anglo-Saxon tradition dominates the people of the United States.

Latin influence has been greatly increased in late years by the large influx of Italian immigrants. It has been increased also by the growing contact with and admiration for French culture. French literature, French educational ideas, and the French language have been a powerful influence in intellectual life from the days when the people of South and Central America won their independence.

The Latin Outlook on Life

It is natural then that Latin Americans should have ways of living and thinking unlike those of people who live in "Anglo-Saxon" America. Life moves at a slower pace. The old Spanish custom of using the central square or plaza as a center of a city's social life still continues in many places. In what the northerner would term "business hours," people of all classes sit there and visit. In the evening, the band plays and everyone strolls around and around, the men usually going one way and the women another. The old rule that women must always be chaperoned still

prevails except in the large cities, where foreign influence is strong. In many places a man still begins to court a girl by "playing the bear," walking back and forth in front of her home, dropping a word as he passes the girl behind her barred window. He may later be admitted to her house, but there is a chaperon near by up to the day of marriage.

Family life is strongly emphasized. The immense majority of the people are Roman Catholic and divorce is rare. The head of the house has a position of honor and authority over his large family, which includes cousins and grandchildren, uncles and aunts, nephews and nieces. Children grow up quickly and spend much time with their elders. Even high-school students like to read serious books such as Emerson's 'Essays' and Victor Hugo's 'Toilers of the Sea', and most young people write poetry. Boys begin early to show an interest in political problems.

Courtesy and friendship, love of beauty and of children, are attractive qualities in Latin Americans. They are seldom in a hurry. Friendship comes first and business second. A stop on the country road to inquire the way is likely to bring you an invitation for a visit. After that the host may insist on riding ahead with you to be sure that you take the

right turn at the next fork of the road. They love conversation, especially about ideas. They are less likely to talk about practical questions or news or the weather than about theories and speculations—why life is what it is and how it would be if certain conditions were different.

With their profound interest in the poetic and philosophic aspects of life, many Latin Americans care little for business. For this reason the North American businessman is likely to look on the Latin American as impractical and even backward. The Latin American, on the other hand, is likely to call his northern neighbor a money-chaser.

But each of these two great groups of people can profit by having neighbors so unlike themselves. The northerner can tone down his brusqueness, his hurry, and his preoccupation with practical affairs by absorbing some of the Latin leisurely and meditative spirit. The southerner can supplement his charm and poetry with some of the northern emphasis on efficiency, order, and respect for property. Young people of the United States could well imitate their southern neighbors in giving more time to studying and discussing political and social questions. Latin American youth might profit by more general use of group games like baseball and football, which teach the individual to play for the honor of the team rather than just for

himself. From these games he could learn to accept political defeat as he would accept defeat on the playing field, without resentment or revolt.

Differences Among Various Countries

Alike as they are in many ways, it would be a mistake to lump all the twenty Latin American countries together in our thinking. Two important causes of difference are climate and elevation. Many of the people live in the hot, wet tropics. They naturally have less drive and energy than those who live in cooler climates. All the west coast countries of South America are greatly influenced in their development by the high Andes Mountains, which not only are a barrier to transportation and communication, but also make education and other unifying processes exceedingly difficult. On the other hand, the great plains of Argentina, Uruguay, and Brazil make for unity and facilitate progress. The fact that the east coast of South America was open to Europe, and the west coast was far removed from the rest of the world until the opening of the Panama Canal, helps to account for other differences in development. Again, the influence of the United States has been large in Mexico, Cuba, and other neighboring lands of the Caribbean.

The various Latin American nations also differ from one another in racial composition. Argentina's population is almost entirely white. Haiti's is black. Guatemala's is 60 per cent pure Indian. In nearly all the republics these races have intermarried. But in each country, the pattern of culture and development is largely set by the most numerous element in the population. A knowledge of the racial situation is

most important, therefore, if we are to understand the differences as well as the likenesses in the various parts of this large region.

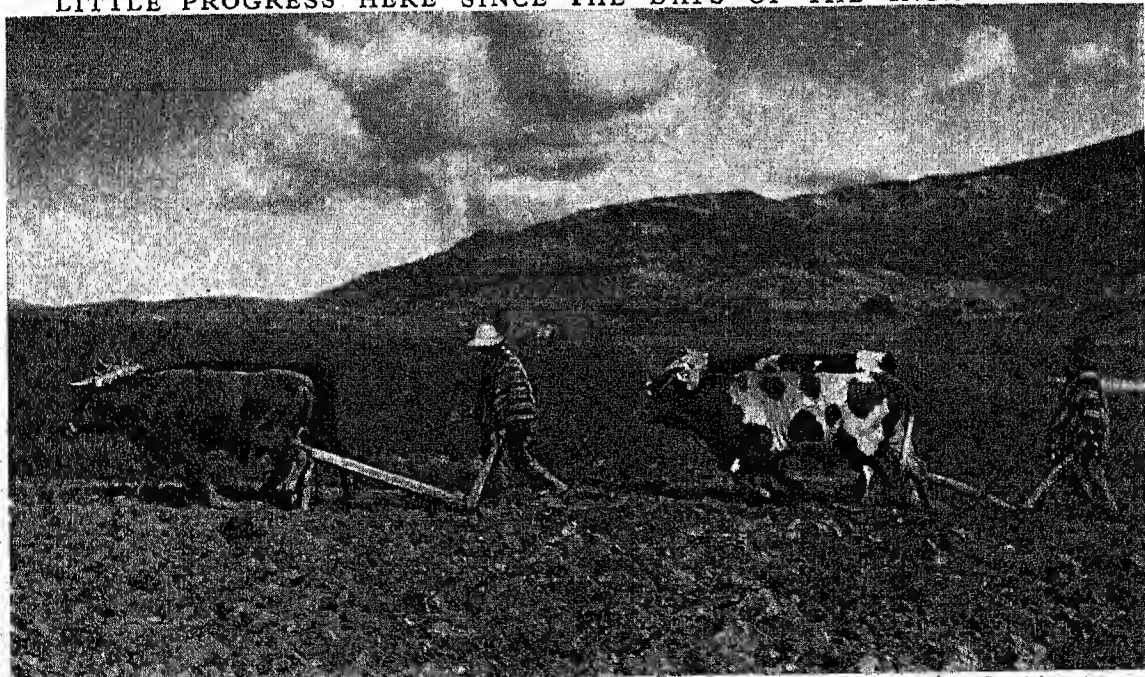
Racial Makeup of Latin America

LATIN AMERICA is made up of two original stocks, Iberian (Spanish and Portuguese) and Indian. Soon after the two stocks had begun to mix, a third was added, the Negro slaves brought from Africa. A long time afterward, during the 19th century, a modern immigration movement began. This added a fourth element consisting of new arrivals from many parts of the world.

The Indians—the Original Americans

The Indians that the Spanish conquistadors (conquerors) found in the New World were of two kinds. Uncivilized tribes, like those that the French and English colonists met farther north, were living in the Caribbean area, in the valley of the Amazon, and in the southern plains. A second and far more important division of the aborigines included the groups that lived mostly in the highlands. These groups had developed remarkable civilizations. The most advanced peoples of this highland division were the Toltecs of the central plateau of Mexico and the Aztecs who conquered them; the Mayas of Yucatan and Guatemala; the Chibchas of the Colombian plateau; and the tribes constituting the Inca Empire. The Mayas, with their highly advanced architecture, sculpture, and science, might be called the Greeks of America. The Aztecs, great warriors who conquered a more highly civilized people, recall the Romans. The Incas were the states-

LITTLE PROGRESS HERE SINCE THE DAYS OF THE INCA EMPIRE



In this high Peruvian valley the Indian farmers till their field with wooden plows. They owe their oxen to the Spanish conquerors but in other respects they are perhaps no better off today than they were when the Incas had their capital at nearby Cuzco.

men of the day, like the ancient Egyptians and Babylonians, ruling territory that stretched 1,200 miles along the western highlands and mountains (see American Archeology; Aztecs; Incas; Yucatan).

All these civilizations were conquered by the Spaniards. That a small group of warriors could overpower such large, well-developed empires is astonishing. Some of the reasons suggested by historians are: (1) the internal divisions within each of the Indian empires; (2) the white man's use of firearms, armor, and the horse, which the Indians had never before seen; (3) the superstitions of the Indians, which led them to believe that the white men might be gods; (4) the lack of initiative resulting from their paternalistic and despotic systems, which did not inspire leadership.

The Spanish Conquerors

The conquistadors were extraordinary men. Audacity, courage, cruelty, nobility—all were combined in such adventurers as Balboa, Cortez, Ponce de León, and De Soto. Many of them had been trained on the battlefields of Flanders or in the campaigns which drove the Moors from Spain. With equal courage they faced savage Indians, mysterious forests, and unending

PRIMITIVE INDIANS



Slender, sturdy, and proud, the natives of the Ecuador jungle are a far more high-spirited people than the natives of the highland.

deserts. And inside of fifty years they had mastered half of the New World for themselves, their king, and their church.

In 1519 Cortez conquered the mighty Montezuma and by 1521 he was master of Mexico. By 1535 Pizarro had plundered Cuzco, the rich capital of the Incas, and had founded Lima, "city of the kings," in Peru. By the middle of the 16th century others had brought most of the West Indies and Central America under the dominion of Spain. Florida and much of the Mississippi Valley had been explored. The government and the church had begun to create orderly communities. Destruction was succeeded by construction—new cities, new churches, new schools; yes, even a new race. For with marriage of the

whites and the Indians came the *mezizo*, the most numerous element of the population, in whom two racial heritages are blended.

African Contribution

The abuses heaped upon the Indians in the forests and mines of the tropical Caribbean lands killed off so many of them that the Spaniards began to import African slaves. The Portuguese did the same in tropical Brazil. Soon the Negro became a third large element in the population of these countries. All the republics freed their slaves in the course of the 19th century. Today Negroes are recognized

as an important element in the national life of Cuba, Brazil, and other countries. Haiti has been a "black man's republic" since its founding in 1804. In countries such as Argentina, Chile, Peru, and Mexico, which brought in fewer African slaves, Negroes have been so thoroughly absorbed in the population that one can seldom detect any African features. Although reliable statistics are lacking, there are indications that the black population in Brazil and the Caribbean countries is gradually becoming brown.

Modern Immigrants

In addition to the three primary strains—Iberian, Indian, and African—there are large groups which came later from Europe and Asia. This modern immigration movement, which began in the 19th century, was especially heavy in Brazil, Argentina, and Uruguay.

Italian immigrants outnumber those of any other nationality. Buenos Aires has about as many Italians as Rome. Brazil has more than two million people of Italian descent, most of them in the state of São Paulo. Spaniards have continued to come in large numbers to all countries except Brazil, where the original Portuguese element has been increased by a steady stream of newcomers.

The Germans form the largest non-Latin group. They are especially strong in southern Brazil and Chile. The English, Scottish, and Irish groups are comparatively small but influential. In the early records of the struggle for independence, the Nelsons, the Edwards, the O'Higginses, and similar names appear frequently. Today many leaders in railway, bank, and

PURE-BLOOD NEGRO



Along the Caribbean shores and in eastern Brazil are many Negroes like this giant river-boatman. They are descendants of African slaves.

business enterprises are of British descent. The "word of an Englishman" is equivalent to our "word of honor." From the United States there has been little permanent immigration, except in Mexico. Poles, Russians, and people from the Balkans are scattered through sections of eastern South America.

The Japanese are particularly strong in Brazil and in Peru. Chinese are found chiefly in Mexico, Peru, Panama, and Cuba. Havana has a large colony of Chinese, many of them stranded there in a vain attempt to enter the United States.

There are several hundred thousand Jews. Argentina has by far the largest number, most of them in Buenos Aires and in settlements of the Jewish Colonization Association in the north. Brazil has large Jewish colonies, particularly in Rio de Janeiro and São Paulo. Mexico's Jewish colonies have been growing, and Uruguay, Colombia, and Cuba have smaller settlements. Small numbers of Jewish refugees from Europe have recently settled in most Latin American countries.

Racial Tendencies Today

Latin Americans usually pride themselves on their lack of race prejudice. In the three largest countries—Brazil, Argentina, and Mexico—there are today three distinct racial tendencies.

Brazil is making the world's most interesting experiment in race mixture. It is deliberately setting out to absorb all the racial groups within its borders and thus to form a "cosmic" or universal race. This will include such diverse elements as the original Portuguese, the Africans who came as slaves, and the Japanese colonists and merchants who have entered in recent times. When the consul general of Brazil in New York City was asked about the difference between the treatment of Japanese in California and Brazil, he said, "In California they seem to be afraid that Japanese will intermarry with the nationals; in Brazil we are afraid they will not." What particular color will predominate as one walks along the streets of a Brazilian city a hundred years from

now does not bother the people today. What they desire is that all shall be loyal Brazilians.

Argentina, on the other hand, is almost entirely white. Its major industry of raising cattle and selling them in Europe never called for the labor of African

slaves or of the native Indians. As early as 1852 the Indian population had shrunk to about 100,000. They had been steadily pushed off the desirable agricultural lands of the Pampa, over which they had hunted like the Plains Indians of North America. In 1879 Gen. Julio Roca drove them far into the south, opening a vast territory for the ever-increasing flood of immigration from Europe. Uruguay, Argentina's neighbor to the north, is almost as

definitely white. Other countries in which the whites are a large element of the population are Chile and Costa Rica.

Mexico Turns Indian

Mexico is almost as dominantly Indian as Argentina is white. At least 90 per cent of its people are Indian or have Indian blood. The policy of the government, since the beginning of the social upheaval—the "revolution"—in 1910, has been to build a new Indo-American civilization. In many parts of the country the capitalistic régime of the whites is being replaced by the ancient Indian communal system. The lands which the Indian village communities long ago lost to the big landlords are being restored. The Indian's art, his weaving, his dances, his folklore are being revived.

Other countries of Latin America where the Indian and mestizo population is especially large are Guatemala, Ecuador, Peru, and Bolivia. The Indian element is also strong in El Salvador, Honduras, Nicaragua, Colombia, Venezuela, and Paraguay. None of

these countries, however, has made so determined an effort to advance the interests of the Indian population as has Mexico.

While the wandering lowland tribes throughout Latin America are rapidly dwindling, the highland Indians, descendants of the civilized agricultural tribes, seem

A PURE INDIAN AND A MESTIZO.



In the upper picture an Indian woman of the Ecuador highlands is carrying a clay water cooler to market. Below is a woman of the same Indian blood, but with a mixture of white Spanish ancestry. She is a skilled weaver of the so-called "Panama" hats.

to be gaining. In 1650 colonial authorities estimated that there were 13 million aborigines. The pure-blooded Indians are now estimated at 17 million.

Population Estimates

The following estimate of population for the 20 republics is based on an average of the figures given by various recognized authorities:

Mestizos (mixed Indian and white)	65,000,000
Whites	25,000,000
Indians	17,000,000
Negroes and mulattoes	15,000,000
Zambos (mixed Indian and Negro)	2,000,000
Asiatics and unclassified	1,000,000
Total (20 republics)	125,000,000

These figures do not include the islands and the territories in Central and South America owned by foreign powers—British Honduras, the Guianas, and most of the West Indies.

The above figures should be regarded only as intelligent guesses, since most Latin American governments have not yet developed accurate statistics, nor do they desire to draw fine racial distinctions. Indeed, Latin America boldly challenges the theory of racial superiority. This challenge grows out of the very nature of the Latin American. He is neither European nor yet exclusively American; neither occidental nor oriental; not white, red, or black. He partakes of them all. A roll call of the heroes of Latin America would emphasize this refusal to make distinctions between men because of their blood. Benito Juárez* and Díaz, the Mexican heroes, were puro Indians. San Martín of Argentina was pure Spanish. Antonio Maceo of Cuba was colored. The greatest of all Latin American leaders, Simón Bolívar of Venezuela, was part Indian. All are equally honored, with no distinction of race.

Contrasts Between the Peoples of the Two Americas

IT IS NOT well to emphasize too much the difference between Latin Americans and "North Americans," as the southerners call the people of the United States. For they are all citizens of a New World, they have selected the same republican form of government, and they have a common faith that they will develop a system of life far better than that of Europe with its many limitations and its ancient hatreds. Yet it is helpful to recognize certain basic contrasts in ancestry, in physical surroundings, and in history.

Conquerors and Colonists

British and Dutch colonists came to a cold climate. They had to work or freeze. Spanish and Portuguese settlers came to a warm climate that would slow down the most active character in the world.

The Puritans who came to New England, the Roman Catholics who settled in Maryland, the Quakers who founded Pennsylvania colony, all were trying to

get away from religious persecution at home. They hoped to find political liberty as well as freedom of worship. They brought their families and built new homes and new social institutions. They set their affections on the New World and expected to retain few relationships with the Old.

The conquistadors of the south came to America to get gold for themselves and their king, and to win converts for their church. They had no thought of setting up new forms of government or religion, and were always looking forward to a joyous return to Europe. Having left their women behind, many took Indian wives; but they seldom set up real homes. The colonists who followed in the wake of the conquistadors also remained faithful subjects of the Spanish and Portuguese monarchs. Their political, cultural, and religious life continued to center in the homelands. For three centuries they had no thought of cutting loose from the European system that ruled them.

Indians of the North and South

Just as important as the difference in the colonists that settled the northern and southern parts of the New World was the difference in the Indians they encountered. The North American colonists found wandering tribes that lived by hunting and fishing. To have intermarried with these nomads or to have retained them as farm laborers would have been impossible. The conquistadors, on the other hand, found well-established civilizations over large areas. They found people living in permanent homes and cultivating farms. So the Iberian colonists took these lands as proprietors and made serfs of the original owners.

Thus began the great landed estates which have been the curse of Latin America during its entire history. These immense estates, some of which cover millions of acres and employ thousands of peon laborers, still exist in most of the southern countries. That is why immigrants in some countries find it difficult to get a foothold on the land. It is why millions of Indians in Peru and Bolivia remain in semiféudal peonage. This was the primary cause of the Mexican "revolution" which began in 1910.

Lack of Preparation for Democracy

The North American colonists formed a complex group representing many different nationalities and creeds. They were influenced by the political and economic upheavals that profoundly changed northern Europe in the 17th and 18th centuries. To achieve order and unity under these conditions, they had to learn the lessons of tolerance and democracy. Their material progress was later promoted by the Industrial Revolution in Europe (see Industrial Revolution). The settlers of Central and South America, in contrast, were under the sole influence of Spain or Portugal, with a common religion, tradition, and culture. Other nationalities were excluded. Trade was confined to the mother countries, where the Industrial Revolution had not yet penetrated. Thus there were few influences tending to encourage political change or to produce such striking economic progress as in North America.

*In conformity with the present-day trend to preserve the native forms of foreign names, Spanish and Portuguese names in this article are written with the accents which they have in those languages, even though they commonly appear without accents in English and American works. For pronunciation, consult the Fact-Index.

From these comparisons it is easy to see why the Latin American countries have failed to move as rapidly toward democracy as did the United States. When the Spanish and Portuguese colonies won their independence, many of their leaders, recognizing the lack of training for democracy, thought that the new countries ought to begin as limited monarchies instead of republics. Brazil, indeed, remained a monarchy until 1889. But the Spanish Americans, inspired by the heroic exploits of the French and American revolutions, at once set up republics modeled on the pattern of the United States. Centuries of colonial subjection were a poor preparation for this republican experiment. Only today, after a century of self-rule, is education becoming sufficiently widespread to give hope that the democratic goal can be reached.

Some Heroic Figures of Latin America's Past

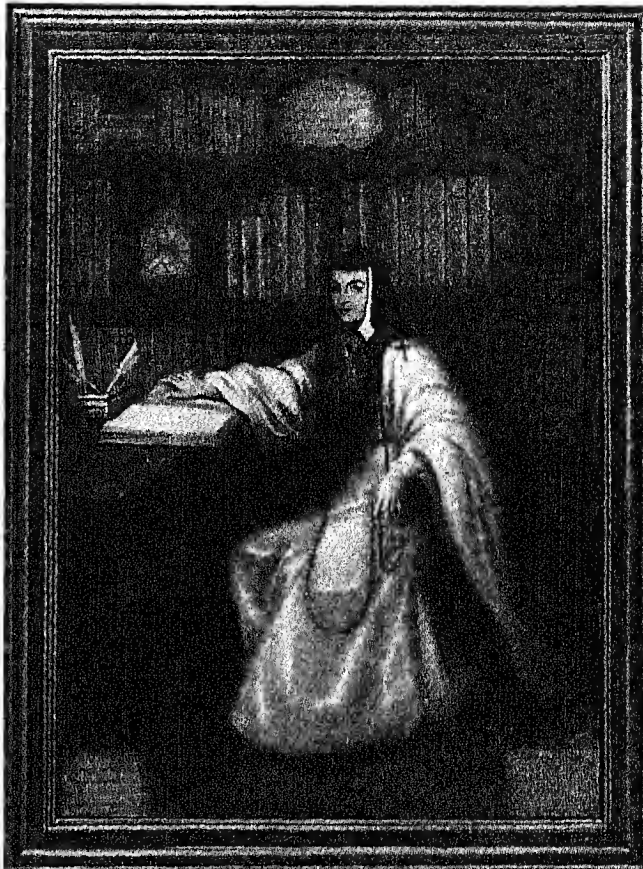
ONE of the best ways to get an understanding of the Latin Americans and their history is to know the stories of their great leaders. In them one finds all the diverse elements of Latin American character. The colonial period may be summed up in the careers of Hernando Cortez, Bartolomé de las Casas, and Juana Inés de la Cruz. Cortez (1485-1547) stands for that combination of heroism, cruelty, lust for gold, and loyalty to king and church that imposed the Spanish system on the longest stretch of colonial empire in the world, from California to the Strait of Magellan (see Cortez, Hernando). All that is finest in the Christian church is represented in Father Las Casas (1474-1566)—protector of the Indian, educator, philanthropist, prince of peace in a world of war (see Las Casas, Bartolomé de). Juana Inés de la Cruz (1651-1695) embodied the virtues of Latin womanhood and the persistence of Spanish culture and religion in the wild frontier life of America. A beautiful lady-in-waiting in the viceroy's court in Mexico City, at 17 she was so familiar with the classics and philosophy that her reputation spread over America and Europe. She was one of the first champions of women's rights. Tiring of the admiration which her beauty and brilliance brought her, she sought quiet in a convent. There she gathered in her cell more than 4,000 volumes. She died at 44, exhausted from nursing the victims of a smallpox epidemic in Mexico City. "The Tenth Muse" she is called because of her learning and her deeply thoughtful verse. (See Latin American Literature.)

The Great Liberators

The struggle for independence (1810-25) revolved around such great men as Simón Bolívar of Venezuela, José San Martín of Argentina, and Miguel Hidalgo of Mexico. Bolívar was one of America's greatest char-

acters. Bold military leader, writer of constitutions, brilliant statesman, author of distinction, friend of most of the great men of his day, he was a genius of the first order. He is the national hero of six nations which owe him their independence—Venezuela, Colombia, Panama, Ecuador, Peru, and Bolivia. Like many another Latin American leader, he passed

A FAMOUS LATIN AMERICAN HEROINE



Juana Inés de la Cruz, 17th-century Mexican nun, won renown for her beauty, her poetic talent, and her self-sacrifice in the care of the poor.

his later years in a shadow, crushed by failure to attain his too impractical ideals (see Bolívar, Simon).

General San Martín started from Argentina, as Bolívar did from Venezuela, to liberate the southern part of the continent. His remarkable march with his army over the Andes in 1817 was a greater feat than Napoleon's march over the Alps. He freed Chile and carried his armies north into Lima, where he proclaimed the independence of Peru. When differences arose between him and Bolívar, he unselfishly left the field and died in exile in Europe. Not so brilliant as Bolívar, he gave to South American youth a model of moral nobility they can never forget.

Different from both Bolívar and San Martín was the leader of the liberating movement in Mexico. Hidalgo was a native Mexican priest who loved his Indian people and tried to better their terrible living condi-

tions by ending the abuses of the government. But his religious superiors joined with the colonial officials to oppose him. On Sept. 16, 1810, he and his Indian followers began a movement for independence. This was finally attained in 1821. In the meantime the great-hearted Hidalgo was excommunicated, captured, and shot as a traitor. But to Mexicans today he is the Father of his Country.

Dictators, Statesmen, and Writers

After the great liberators had won independence for their nations, then began the long hard journey toward democracy. Without proper preparation, stable institutions of law and order were slow to develop. If we study events alone, from 1825 to the opening of the 20th century, we see little but revolutions, dictatorships, and periods of anarchy. But when we begin to study characters, we see much to admire.

Many of the dictators, called by the people *caudillos*, or chiefs, were often not only forceful leaders but men of other fine qualities. Like some of the frontier heroes of the United States, they were quick on the trigger, because they believed that was the only way to bring order out of anarchy. There is no more exciting reading than the stories of some of these men: Juan Manuel Rosas of Argentina, Gaspar Rodríguez Francia of Paraguay, Gabriel García Moreno of Ecuador, Porfirio Díaz of Mexico. They and others like them controlled most Latin American countries through the 19th century.

The dictators had their opponents, whose lives give an equally interesting picture of those troubled times. Take for example Domingo Faustino Sarmiento of Argentina, called "Crazy Sarmiento" by his opponents, who hated his love for schools and for the United States. Sarmiento was born in 1811, two years after Abraham Lincoln. He admired Lincoln greatly, and led a life that paralleled Lincoln's in many ways. His parents, very poor, lived in the frontier town of Mendoza. He had little schooling and got most of his education by reading and rereading a few great books, several of them the very books that inspired Lincoln. When he was 17, he was exiled because of his opposition to the dictator Rosas. In his wanderings he began the study of education and democracy, which became the primary concerns of his life. While he was in the United States, he met the great educator Horace Mann. Captured by Mann's ideas, he wondered

how he might put them into effect in his own land. Then came the surprising news of his election to the presidency, which like Lincoln's might be called a political accident. As president, 1868-1874, he did so much for public schools that he became known as the "schoolmaster president." His was the first government in Latin America to bring teachers from the United States. With their help he started a system of normal schools and kindergartens, and began the development of the admirable public school system which Argentina enjoys today.

Another heroic character who, like Sarmiento, worked to bring order and organization out of confu-

sion and revolution was Andrés Bello (1781-1865) of Chile. The visitor to Santiago will never forget the fine benevolent figure of Bello, carved in marble and seated serenely in a great chair, before the presidential palace. He was born in Venezuela, taught the great Bolívar, and represented his country in London during the independence movement. Called to Chile to or-

ganize the young republic's educational life, he codified its laws, organized the University of Chile, and set all Latin America a high standard for scholarship.

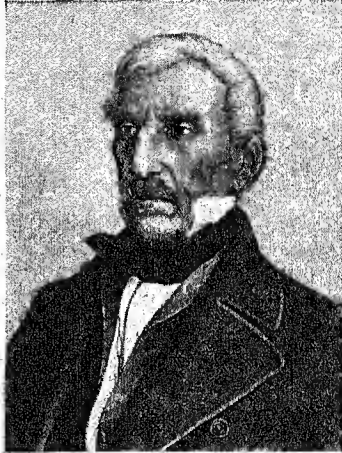
The centennial of the birth of another of these great men, Eugenio María de Hostos, was celebrated by all Latin America in 1939. Born in Puerto Rico and educated in Spain, he contributed something to the development of almost every Latin American country. In Chile he started the plans for the Transandine railroad and opened the university to women. In Peru he strove to prevent mistreatment of the Chinese immigrants and made a long fight against graft in building the famous Central Railroad, the highest in the world. In Venezuela he taught law in the university. In Cuba he gave great impetus to the movement of *Cuba libre* ("free Cuba"). In the Dominican Republic he spent 15 years in reorganizing the educational system. He wrote outstanding books on such widely varying themes as constitutional law, commentaries on Shakespeare's plays, social science, and pedagogy.

Latin Americans seem to be born with a natural gift for writing, and they honor their great writers to a degree that astonishes visitors from other countries. Sarmiento wrote 52 books, De Hostos about the same number. The Chilean José Toribio Medina, whose death in 1930 was mourned by all the Spanish-speaking

FATHERS OF SPANISH-AMERICAN INDEPENDENCE



Simón Bolívar



José San Martín

TYPICAL SPANISH COLONIAL CHURCH ARCHITECTURE



This is the Church of La Merced in Antigua, Guatemala. Rebuilt after an earthquake in 1773, it is an excellent example of the massively built Spanish American churches, with their small windows leaving wide spaces for beautifully detailed decoration.

world, wrote and edited more than 250 volumes. Many of these he printed on a little press in his own home. When the Mexican poet Amado Nervo died at a Pan American conference in Montevideo, his body was accompanied to Mexico by Argentine and Uruguayan cruisers. In Mexico the whole nation declared a holiday on the day of his funeral. His death caused more comment in Latin America than did the opening of the Panama Canal. When Ricardo Rojas, a celebrated Argentine writer, completed his 25th year of authorship, his compatriots celebrated the event in an elaborate ceremony attended by the President of the republic and representatives from many foreign countries. (For a survey of the literature of the various republics, see *Latin American Literature*.)

Culture, Recreation, and Education

LITERATURE is the most highly honored art form in Latin America. But the Latin Americans also express themselves with facility in all the other arts, and some of their painters, musicians, and sculptors have won world-wide fame.

There are three principal strains in the cultural life of the Latins of the New World. The first is Indian—the contribution of the native inhabitants, who in some instances possessed a highly developed civilization of their own. The second of these strains is European—the arts and the ways of living brought during the 16th century by the Spanish and Portuguese colonists. Out of these two strains emerged, during the period of independence, what might be called a third, and truly New World, culture. This is expressed in the painting of Mexico and Argentina, the sculpture of Chile, and the music of Brazil. Here the artists have drawn on their European heritage for

technique and on their native surroundings for subject, to produce excellent and original works of art.

Painting, Sculpture and Architecture

During the colonial period, the European settlers had little leisure to devote to the fine arts. Such works of art as were produced were mostly a pale imitation of European models. Spain and Portugal exercised their greatest influence through the church. Missionaries taught the natives many new crafts, and encouraged the practise of the old crafts with results that are still evident throughout Latin America in marvelous lace work, metal work, pottery, and wood carvings. Architecture followed Old World patterns. Churches were richly ornamented in the florid baroque style.

Houses were generally built of stone, with small grilled windows, flat roofs, and a central *patio*. In re-

cent years some of the large cities have begun to build tall structures like the skyscrapers of the United States, and apartment houses of modern design.

After Spanish America broke away from the mother country, painters and sculptors from many parts of

BUILT IN THE DAYS OF THE VICEROYS



The Torre-Tagle mansion in Lima, Peru, is perhaps the best remaining example of Spanish colonial residences. Note the carved overhanging balconies and the decorated entrance.

Europe came to the New World, attracted by the artistic possibilities in the vigorous new nations. But the political and social upheavals of the 19th century gave little opportunity for artistic expression. Moreover, artists continued to look to Paris, Rome, and Madrid for inspiration. Not until the close of the century did art of a more native flavor begin to appear.

This modern tendency is best illustrated in the work of a school of Mexican painters which arose after the revolution of 1910. The long-oppressed Indian struggling for justice became a heroic figure in the rich dramatic murals painted on the walls of public buildings by Diego Rivera, José Clemente Orozco, and Da-

PART OF A DIEGO RIVERA MURAL



In this fresco from the walls of the Casa de Cortes at Cuernavaca, Mexico, the painter shows the conquered Indians bringing food from their farms as tribute to Cortez, the conqueror.

vid Alfaro Siqueiros. They and their host of followers created a revolution in art that was quite as sweeping as the social revolution they celebrated. Native themes also dominated the work of the outstanding artists of the other republics. Cesáreo Bernaldo de Quirós of Argentina painted the gauchos of his native province. Candido Portinari of Brazil portrayed the life of the Negroes on the coffee fazendas. Cesar Villacrés of Ecuador started a trend with his broad free paintings of the native Indians. In sculpture Chile excelled, with Nicanor Plaza and Virginio Arias as the fathers of the modern movement.

Music, the Dance, and Other Recreations

The music of Latin America was long sharply divided into Spanish and native forms. Church music was the most significant influence in the early compositions of the European settlers. Typical of native music were the *vidalitas* and *estilos* of Argentina—short laments in ballad form, sung by the gauchos to the accompaniment of a guitar, as they contemplated the great open pampas. Such ballads of love, of sorrow, and of joy are popularly known as *corridos* and are sung everywhere by the common folk. With the increased interest in native art, modern composers began to weave into their music the simple melodies and rhythms of the Indians. This influence is discernible in the compositions of the Brazilians Carlos Gomes,

Heitor Villa-Lobos, and Fructosa Vianna; the Mexicans Carlos Chávez and Silvestre Revueltas; and the Peruvian André Sas.

More than any other art, the spirited folk dances of Latin America express the emotions of the people. Some of them, such as the tango, the rumba, and the conga, have delighted the public of the United States and other countries with their grace and verve. Many of the national dances are performed in groups. In the *pericón* of Argentina and Uruguay, couples dance in a circle to a varied tempo, accompanied by lusty shouts typical of a cattle-raising people. The Chilean *cucca*, by contrast, is danced by a single couple, and is highly individualistic; the man, at first swaggering in his cowboy garb, ends on bended knee, symbolizing a lover's submission. Some of the other popular dances are the *marinera* of Peru, the *bambuco* of Colombia, and the *jarabe* of Mexico. The *maxixe* of Brazil has a distinctive African Negro rhythm.

Fiestas and Popular Sports

Patriotic and religious festivals are numerous. Hardly a month goes by without some special *fiesta* or festival. Christmas, Easter, New Year, Carnival, Columbus Day, Pan American Day, and Independence Day are everywhere celebrated with colorful processions and gaiety. In addition to these national holidays, every town and village has its own special fiestas to honor a saint or to celebrate the new harvest or to observe some special event such as the blessing of the boats in Brazil on June 29. Processions, music, folk dances, and flowers are features of all these festivals. (See Holidays and Festivals.)

Along with songs, dances, and popular festivals, the Latin Americans are spending an increasing amount of their leisure time in sports. In the 19th century the colonial pastimes of cock fighting and bull fighting were the chief forms of amusement. But in recent years these have declined in favor of soccer and Rugby football, baseball, basketball, boxing, tennis, cycling, rowing, and other sports imported from Europe and the United States. Pelota, or *jai alai* (*hí a-lí*), introduced into the republics from Spain, is also a popular diversion. Polo and horse-racing are favored by the wealthy.

The larger cities have magnificent theaters and opera houses. Here the finest artists of Europe and the United States perform before huge audiences, for the Latin Americans are passionately devoted to the opera, the symphony, and the drama.

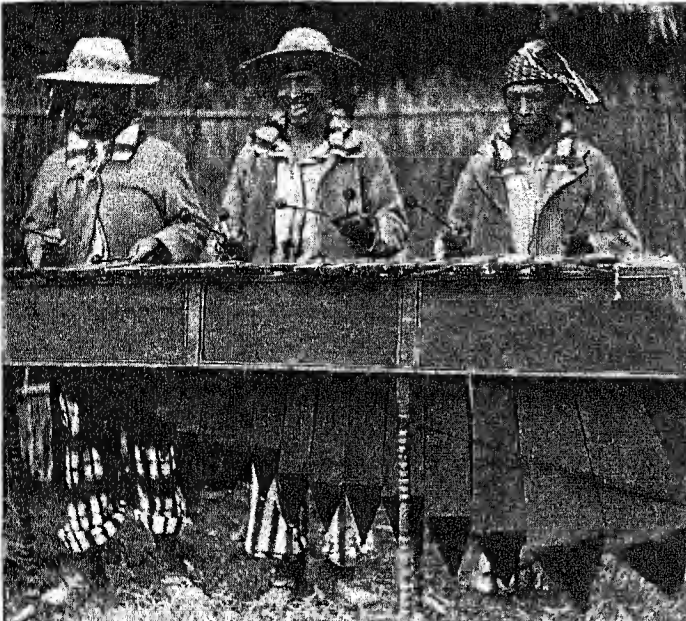
Millions of people every week attend the motion pictures, most of which are made in the United States, with dialogue in the native language. Boys and girls eagerly follow the comic strips of the United States. These games and diversions, which all the Americans now share, are a powerful factor in cementing inter-American unity.

Education, Universities, and Schools

In colonial times, schools and universities patterned after those of Europe trained the sons of the upper classes to become leaders in the church and in the pro-

fessions. Missionary schools gave the Indians instruction, chiefly in religion and the manual arts. After the winning of independence, leaders like Sarmiento urged the establishment of public schools to fit the people for the responsibilities of self-government. But progress was slow. The new republics were poor and often disturbed by political quarrels. There was no middle class to demand and finance a program of education for all. And so the tradition of special opportunities for the few and a minimum of

MARIMBA PLAYERS OF GUATEMALA



The marimba is the ancestor of the xylophone. It consists of strips of wood of different lengths with tuned resonators underneath. Bladders are attached to the resonators to intensify and alter the quality of the tone.

education for the many long survived. But in recent decades there have been great advances, despite the struggle in many countries between government and church over school control and educational policies.

Each of the twenty republics has a minister of education who is responsible for the public school system. Attendance is required by law. But sparse, scattered populations and small budgets have so far prevented even the most progressive countries from putting schools within the reach of all. Even in Argentina about one quarter of the children of elementary school age are not in school. And in Latin America, as a whole, the vast majority of children do not get beyond third grade. Yet some countries have spent 20 per cent of their total budget on schools.

The various countries differ widely in their educational development. In South America the best organized school systems are in Argentina, Uruguay, Chile, and Brazil. In northern Latin America the leaders are Costa Rica, Mexico, and Cuba. Mexico has become famous in recent years for its rural schools.

The educational program for each nation provides four general types of instruction: Primary or elemen-

tary, secondary, normal (teacher, education), and cultural or professional. Elementary instruction in the more advanced sections consists of a six-grade course which a pupil is expected to complete in as many years. In many sections, however, only two to five grades are provided. Secondary schools include another five or six years of instruction.

Cultural, professional, and technical instruction is given by the universities and professional schools. The majority of the republics have universities which

offer courses in philosophy and the liberal arts, law, medicine, and engineering. The length of the courses varies according to the end in view. In general, the degree of doctor of letters or philosophy may be attained in four years, and doctor of medicine or of law in six years. Some countries provide advanced instruction in engineering, industrial, mechanical, and civil, with a five- or six-year course in each branch. The medical faculties usually offer courses in dentistry and pharmacy. Departments of economics, agriculture, and education are being organized, but are as yet in the earlier stages of development in many countries.

The quality of professional education, especially in South America, is steadily improving. The number of years demanded for a degree permits the inclusion of some of the cultural studies which in the United States and Canada are covered in college courses.

In most countries university organization and curriculum follow French or German patterns, though the influence of the United States has been felt in some countries and is becoming stronger. Most of the lectures are given by professional men or government officials who devote only part of their time to school duties. Consequently there is little personal contact between students and professors. Dormitories, "campus life," intercollegiate athletics, and what we call "college spirit" are generally lacking, though there are a few notable exceptions.

Private schools carry a large part of the educational load in some countries. They are of three kinds: those conducted by religious agencies, by individuals, and by foreign colonies. Roman Catholic schools are overwhelmingly in the majority. Protestant churches in the United States have schools in most of the principal cities. Foreign colonies, especially English, French, German, Italian, and more recently Japanese, have well-equipped institutions. The last three have been used as centers of fascist propaganda. Most governments now supervise private schools to prevent such activities.

A notable characteristic of Latin American education is the interest that students in universities

and even in secondary schools take in public questions. The "student movement" of recent years has agitated for reforms in education and social organization. Students and laborers have united to bring about a new order, even at times taking up arms against abuses. The energy that youth in the United States expends on the athletic field is often used by Latin Americans in debating public questions.

The educational systems of Latin America have been constructed, like their political systems, on a highly idealistic basis. There can be no doubt of the desire of the leaders to minister to the educational needs of their people. The noticeable defect is on the practical side, in failure to meet actual needs and local conditions. But this defect is being remedied in many countries. Everywhere educational leaders are striving to improve the quality of instruction and make it more practical, to extend it to more of the children and to illiterate adults, and to provide better-equipped teachers.

Economic and Social Developments and Chief Problems

MANY OF THE difficulties which Latin America has met in trying to spread education and democracy arise from its economic handicaps. Though most of the republics won political freedom early in the 19th century, they continued to suffer from the defects of the old colonial economic system—vast estates, primitive mining methods, and isolation from the outside world.

Mountains and jungles make trade difficult. Among the most costly railroads in the world are those running from the coast up and over the Andes in Ecuador, Peru, Bolivia, and Chile. The famous Madeira-Mamoré Railway, built through the jungle to carry rubber from eastern Bolivia to the Amazon, was costly not only in money but also in life. For every tie laid, one native is said to have lost his life. To heighten the tragedy, by the time it was built the rubber industry in the Amazon had collapsed; and today much of the roadbed is grown over with tropical underbrush. The lack of highways and railroads has not only isolated the nations from one another but it has also kept each country divided into regions which have little intercommunication. Only now, with the airplane and motor truck, are these difficulties being partly overcome.

In their trade with the rest of the world, Latin American countries were hard hit by the depression which began in 1929 and by the European war which broke out in September 1939. Before the war, serious difficulties were created by such restrictive measures as quotas, exchange controls, and clearing and barter agreements. When war came, trade with Europe was reduced to a fraction of what it had been.

Much of Latin America's production is primarily for world markets. Normally it sells abroad most of its coffee, sugar, cacao, bananas, flaxseed, chicle, and a considerable fraction of its wheat, corn, and livestock products. Nearly all its tin, silver, copper,

petroleum, and other mineral products is produced for export. In exchange for these foodstuffs, raw materials, and minerals, it imports textiles, clothing, prepared foods, machinery, automobiles, railway equipment, and other manufactured articles of every kind.

In the years preceding the war, the United States took about one-third of all Latin American exports. Great Britain took about one-fifth and Germany about one-tenth. The United States supplied slightly more than one-third of the imports, and Great Britain and Germany together supplied slightly less than one-third, with Germany steadily gaining. Europe as a whole accounted for about one-half of all Latin American trade.

With European markets temporarily demoralized, the southern nations were faced with the problem of finding other ways of marketing their surplus commodities. The United States was vitally interested in helping to solve this problem, because about one-fifth of its total world trade is with Latin America. But its efforts to assist Latin American nations in disposing of these surpluses and to protect them from the necessity of dealing with a Nazi-dominated Europe on its own terms faced serious difficulties. Chief of these is the fact that the United States produces many of the same minerals and agricultural products as Latin America, and hence is not in a position to provide markets for these.

Dependence of most Latin American countries on one or two products has been another great drawback. When Chilean nitrate, Bolivian tin, Brazilian coffee, Mexican oil, Cuban sugar, and Costa Rican bananas are in demand in foreign countries, the producing countries are prosperous. But when war or financial crisis or competition cuts down the foreign market for one of those products, then the Latin American country which depends on it suffers greatly.

Further, countries that primarily produce raw materials are always at a disadvantage in relation to countries that manufacture. Wages cannot be so high on farms or in forests and mines as in mills. The outstanding limitation on the economic development of Latin America has been its cheap labor. At least three-fourths of the people are miserably poor. This low standard of living limits purchasing power. It prevents large-scale industry with the low costs that come from mass production. It is also a tremendous drag on government, limiting the taxes it can collect to improve the country.

Another problem arises from the great size of foreign investments. All the Latin American countries have relied largely on foreign capital and foreign management to build their railways, port facilities, and public utilities, and to develop their great manufacturing, mining, and agricultural enterprises. Most of the immense amount of capital thus invested has come from Great Britain and the United States, about 6 billion dollars from each. Interest payments and dividends on these investments therefore take great sums out of the Latin American countries every

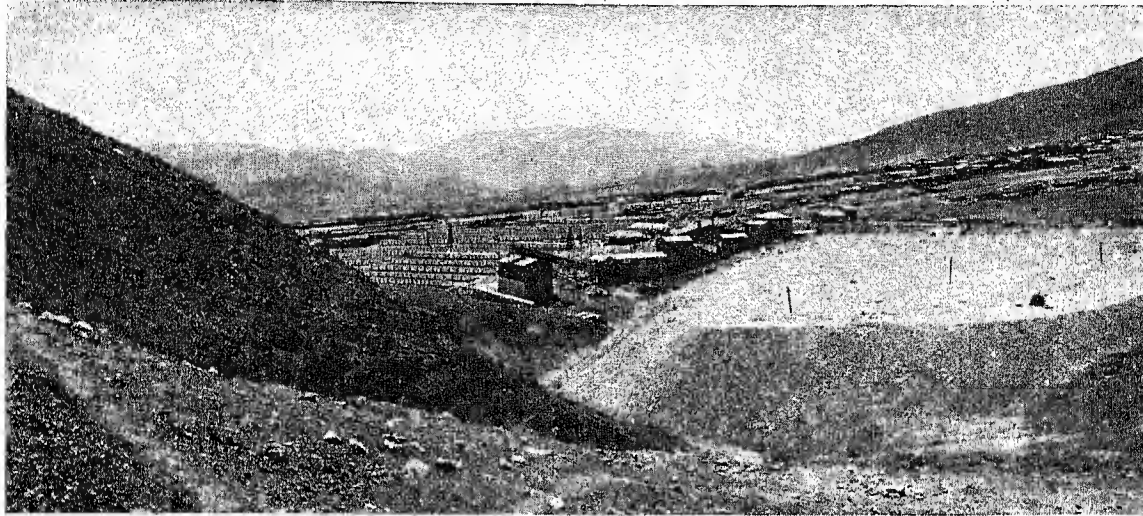
year. In the depression years since 1929, many of the private enterprises thus financed have failed, and most of the governments have defaulted on their obligations to foreign bondholders.

Movements to Solve These Problems

The southern countries are working bravely to correct these evils. The problem of breaking up the large landed estates is being thoughtfully studied. Mexico has led in this. From 1915 to 1938 it distributed from the big estates 49 million acres of land to

More goods are being manufactured at home. Mexico is making its own shoes, hats, cotton goods, newsprint, chemicals, and even steel products. In 1920 Brazil had 13,300 industrial enterprises; by 1930 it had 30,000. Argentine factories in 1936 supplied 80 per cent of the woolen goods and 33 per cent of the cotton cloth used in that country. Chile sells its manufactured goods to its west coast neighbors. It has recently come to be an important publishing center for all Latin America. Branch factories are being built

RICH TIN MINE NEAR POTOSI IN SOUTHERN BOLIVIA



One-fourth of the world's tin comes from Bolivia, but economy requires that Bolivian ores be mixed for treatment with purer ores from Malaya. Thus they are usually shipped to Great Britain, which controls the Malayan supply. Until recently, this condition prevented the United States from building smelters capable of producing tin directly from Bolivian ore.

1,469,000 peasants. Reform administrations in Colombia and Chile also have recently begun to work vigorously on the land problem.

In many other ways the governments are trying to improve the conditions of their workers and give them more comfort and security. Many of the countries have labor laws that compare favorably with the most advanced codes in other parts of the world. They provide for minimum wages, hours of labor, the right of labor to organize, protection of women and children, and provision against accidents. Some countries have accident insurance, retirement and old-age pensions, and benefits for the sick. Special attention has been given to housing low-wage workers in Argentina, Brazil, and other South American countries. In recent years governments have promoted the building of low-rental houses and apartment buildings. Nearly every country has a ministry of public health, which is lowering the toll of death and disease.

Efforts to Increase and Diversify Production

To improve its economic position, nearly every country is striving to diversify its production. Brazil is reducing its dependence on coffee by growing more cotton. National departments of agriculture are becoming the most active branches of governments. They are studying soils and markets to find what new crops might be profitably produced.

by many great industrial firms of the United States and Europe, which seek in this way to avoid high tariffs and restrictive regulations.

This development of factories does not necessarily mean that Latin America will soon develop great industrial centers like Pittsburgh or Birmingham. Such a possibility is limited first by the lack of certain basic materials, especially coal and iron, and second by the absence of a dense population with large buying power. It will be a long time before Latin America will be able to manufacture for itself the heavy machinery, the automobiles and other mass-production articles it requires, and the special fine goods that it now imports from abroad.

Steps to Control Foreign Capital

The development of industrial strength through new enterprises has encouraged Latin American countries to take steps to control foreign capital. Mexico has gone farthest in this respect. But practically every country in Latin America has adopted one or more of the following methods:

1. Sixty to 90 per cent of the employees of any corporation must be nationals of the country in which it operates.
2. Foreign firms must be domesticated in the country in which they operate and must be subject to its regulations.
3. Part of the profits must be reinvested in the country, and exports of capital and profits are restricted.
4. By control of foreign exchange, exports of money or

goods are regulated to suit each country's trade and political policies.

5. In some instances national governments have taken complete control of foreign investments. This has been done either by establishing a government monopoly to which foreign companies are compelled to sell their properties, or by expropriation (government seizure) of foreign property, with the more or less remote possibility of compensation.

Mexico and Bolivia provide examples of expropriation. They have taken over foreign petroleum lands, and Mexico has seized many large foreign holdings of farm lands for distribution to the peasants. Such seizures present the United States with one of its most difficult problems in maintaining good relations with its neighbors to the south.

The Latin American argument runs somewhat as follows: "Foreigners have been getting the best out of our land for centuries. They have grown rich by exploiting our resources and our people. The time has come to readjust the situation. Social justice for millions is more important than profits for a few. Natural resources such as oil belong of right to the nation itself. They should be used to build schools, roads, and health for our own people and not to enrich outsiders."

The foreign investor argues: "We foreigners were invited to invest our money in your country. We have a right to expect that our property will be protected by law. We pay better wages than your own nationals do. We pay taxes without which the government could not carry on its program. If you do not protect foreign capital, we will lose confidence in your country and cease our investments. Without foreign capital, your country will not develop and your trade will be stifled."

The recent policy of the United States government has been to try patiently to find a line of compromise, whereby the representatives both of social rights and of private property may find justice. Where formerly it usually took the side of its investors, today it is trying to get both the investors and the Latin American governments to adjust their differences by negotiation.

This problem is only one of the many that the people of the United States and of Latin America have to solve if they are to unite in their friendly development of the Western Hemisphere.

Relations Between the American Republics

WHEN LATIN AMERICA started its independent existence, it extended all the way from Oregon to Cape Horn. The United States began with only a thin line of territory on the Atlantic coast. Soon it began to grow—largely at the expense of Latin America. It gained Florida, the enormous Louisiana Territory, and Texas. Then it took a mighty jump to California. Before the war with Mexico (1846–48) the Latin Americans looked upon the United States as "the great sister nation of the North." But after the war they began to suspect and fear it. After the Spanish-American War (1898)

the United States further enlarged its possessions by taking Puerto Rico and the Canal Zone. By the Platt Amendment it assumed the right to intervene in the affairs of Cuba. After the building of the Panama Canal, the United States began the practise of intervening—sending armed forces to settle internal quarrels—in the countries around the Caribbean Sea. It was then that the people to the south gave it a new name, the "octopus of the north." After each of these interventions, great parades of students would march through the streets of Latin American capitals protesting against "Yankee imperialism."

This fear and suspicion continued to increase until 1933, when the United States signed a treaty with Latin American countries agreeing that "no state has the right to intervene in the internal or external affairs of another." This was the "good neighbor policy" and marked the beginning of a fundamental change in Pan American relations.

Pan American Conferences

The agreement not to intervene in one another's affairs was signed at the seventh Pan American conference, at Montevideo in 1933. These conferences, officially called International Conferences of American States, have had two main purposes: first, the peaceful settlement of all disputes arising between the republics of America; second, the encouragement of inter-American commerce and the strengthening of both commercial and cultural ties. As early as 1826 the great South American patriot, Simón Bolívar, called a conference of the American republics to assemble at Panama. Only four countries were represented. The United States appointed delegates, but too late to be represented. Although no decisions of great importance were reached at this conference, it was the first move in forming the close ties that now link the American republics.

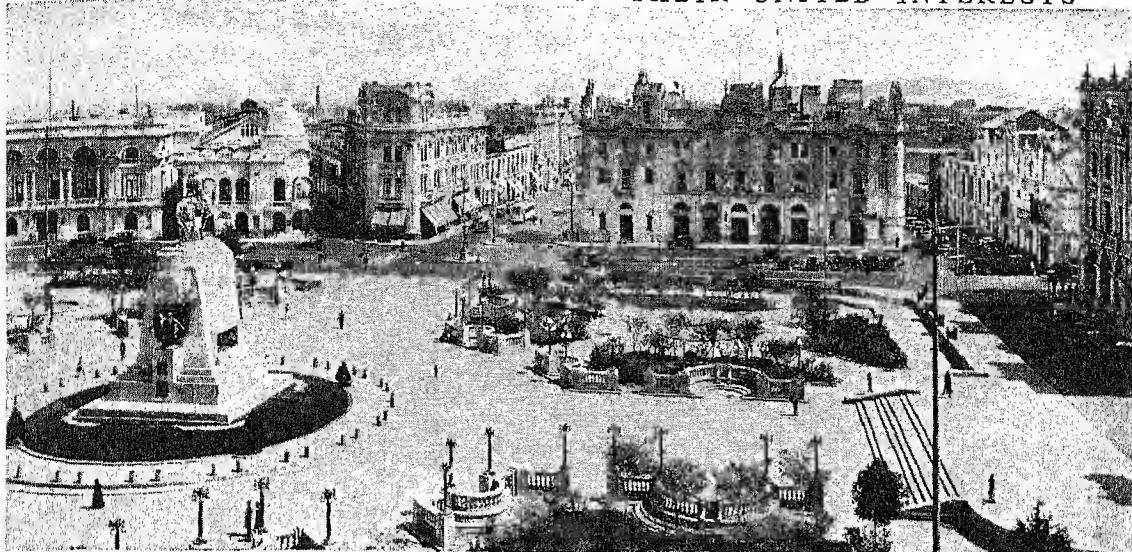
The Pan American movement received its clearest expression at the First International Conference of American States, which met at Washington in 1889. This conference was called on the initiative of James G. Blaine, who was secretary of state in President Benjamin Harrison's administration and who is sometimes called the "father of Pan Americanism." Its chief accomplishment was to set up a bureau which later became the Pan American Union.

The second conference was held in Mexico City in 1901–02. The third met in Rio de Janeiro in 1906; the fourth, in Buenos Aires in 1910; the fifth (delayed by the World War), in Santiago in 1923; the sixth, in Havana in 1928. As a result of these six meetings a number of treaties relating to economic and political questions were signed. But their usefulness was always limited by the intervention policy of the United States.

The Good Neighbor Policy

At the seventh conference at Montevideo in 1933, the United States reversed this policy. Secretary of State Cordell Hull, who headed the United States delegation, announced that intervention would cease.

WHERE 21 REPUBLICS AFFIRMED THEIR UNITED INTERESTS



At Lima, the ancient capital of Spanish America, and today the capital of Peru, the eighth Pan American conference met in 1938. This is the Plaza San Martín in the center of the city, dedicated to a hero who helped to free Latin America from European bondage.

He declared that his government did not represent the bankers, nor would it push the collection of debts. He further proposed that the American countries should set an example to the world by lowering tariffs. This should be done by reciprocal trade agreements between two or more countries, with the "most favored nation clause"—that is, that favors agreed upon by any two nations should be open to all other nations on the same basis. Within a few years such treaties were signed with a majority of the American countries.

The "good neighbor policy" bore important fruits in succeeding conferences. A special Inter-American Conference for the Maintenance of Peace was called by President Franklin D. Roosevelt to meet at Buenos Aires Dec. 1, 1936. President Roosevelt himself opened the conference with an address which notably strengthened Latin American faith in democracy. Building on the newly acquired confidence in the United States, the American nations agreed to consult together if the peace of this hemisphere were threatened either by an attack from the outside or by a quarrel between American countries. Several treaties were signed which added to the development of peaceful relations in the New World.

Declaration of Lima

Two years after the Buenos Aires gathering, the eighth Pan American conference met at Lima, Dec. 9, 1938. When the delegates gathered, one question overshadowed all others: What was to be the attitude of the American Continent toward nations that threatened it from the outside? Three totalitarian states, Germany, Italy, and Japan, had recently developed their propaganda to an alarming extent. Americans, North and South, were anxiously asking whether the propaganda of the fascist states had won any of the American republics to the totalitarian idea. On the last day of the conference—appropriately on

Christmas Eve—a great historical document known as the Declaration of Lima was adopted. Its preamble and five declarations affirmed the unity of the American Continent and committed the twenty-one governments to stand solidly together in defending their republican institutions against all outside attacks.

American Solidarity in the Face of Europe's War

A world crisis soon tested this new unity. When war broke out in Europe in September, 1939, the foreign ministers of the twenty-one nations met in the city of Panama to take steps to protect American neutrality. Chief of the measures adopted was the Declaration of Panama, which established a "zone of security" around the Americas south of Canada. Within this zone, averaging 300 miles wide, the warring nations of Europe were asked to avoid all hostile acts.

The Panama conference also set up a committee to recommend measures for economic and financial cooperation which would increase trade among the American nations and thus offset the loss of European markets. A second committee undertook to formulate proposals for safeguarding American neutrality.

Monroe Doctrine Now a Pan American Policy

A second meeting of American foreign ministers opened in Havana, July 21, 1940, in an atmosphere even more tense than that of the Panama conference. Now that France and the Netherlands had been defeated by German arms, the danger arose that Germany would gain possession or control of French and Dutch territories in the Americas. To avert such action, the foreign ministers adopted the Act of Havana, whose terms may be summarized as follows:

1. The nations expressed unanimous opposition to the transfer of any European possessions in the Western Hemisphere to the control of another non-American power.

2. If such a transfer seemed imminent, the American nations would establish a provisional administration over the threatened region. This administration would govern the

territory until it was considered capable of governing itself or until it was restored to its former status. The provisional administration would be established by an Inter-American Commission of Territorial Administration, composed of one representative of each of the ratifying states.

The Act of Havana expressed the determination of the American nations to resist by swift and united action the menace from without. The New World thus notified the totalitarian states of the Old World that this continent stood solidly united for the American system and the Monroe Doctrine. (*See also* Monroe Doctrine; Roosevelt, Franklin D.)

When the United States found itself at war with Japan and Germany in December 1941, the response of Latin America was swift. All the republics at once acted to show their unity in the defense of the Western Hemisphere. Some declared war on the Axis powers. Others broke diplomatic relations, or granted the United States non-belligerent status to enable its armed forces to use their facilities.

The foreign ministers of the American nations followed this up by meeting at Rio de Janeiro in January and voting to recommend that all break off diplomatic and commercial relations with the Axis. They also recommended an international campaign against Axis espionage and sabotage, and mobilization of materials, machinery, and transportation facilities for the common defense.

New Activities of the United States

Even before the outbreak of war in Europe in 1939, the United States government had been actively working for closer coöperation with Latin America. President Roosevelt appointed an Interdepartmental Committee on Coöperation with the American Republics, which reported Nov. 10, 1938. It outlined a far-reaching program for the improvement of political, economic, cultural, and military relations.

On the economic front, the Export-Import Bank was a powerful agency in helping American nations weather the difficulties created by the loss of foreign markets because of the war. This bank, set up in 1934 to aid in financing foreign trade, made many loans to the various republics. These loans helped them keep their finances stable, supplied credit for their trade, and provided funds to develop their resources, their communications, and their transportation facilities.

As a result of this policy the United States made many trade agreements with its neighbors. A typical instance was the agreement with Brazil, March 10, 1939. The Export-Import bank made loans to enable Brazil to set up a reserve bank and to finance its trade with the United States. Other government agencies sent specialists to help Brazil develop rubber and other products needed by the United States.

To serve as the center for the coördination of cultural, commercial, and defense relations in the Western Hemisphere, President Roosevelt in 1941 established the Office of the Coördinator of Inter-American Affairs. Nelson A. Rockefeller was appointed to head this office.

The Department of State has organized a Division

of Cultural Relations to serve as a channel of communication and coöperation in cultural matters. This division does the work necessary to carry out a treaty signed at the Buenos Aires conference which provides that each American country shall send at its own expense each year two graduate students or teachers and one professor to every other American government signing the treaty.

Challenge of American Unity

Out of the tragic struggles of the Old World seems to be coming at least one good result—the closer unity of the New World. In spite of differences between the twenty-one republics, all are enthusiastic believers in the American way of life, all are confident of the American future. Democracy, while not practically attained in all the republics, is unanimously accepted as the ideal. Popular education, though retarded in certain regions by sparse population and high costs, is a universal desire.

No American government is scheming to conquer its neighbors or to disrupt their national life by racial or religious persecution. Economic rivalries are few, pointing to the high degree of self-sufficiency that the Americas may have when they learn to coördinate their production and trade.

Europe may fight for "living room," but not America. Here are vast regions to be populated, great waterfalls to be harnessed, giant trees to be felled, stores of minerals to be dug. Here is the youthful enthusiasm, the buoyant step, the joyous marching song of those who believe in the future. (*See also* America; Central America; South America; and articles on the various countries.)

The Pan American Union and Its Work

IN 1940 THE Pan American Union celebrated the 50th anniversary of its establishment as the "Clearing House of Good Will" for the twenty-one American republics. The Union was originally established in 1890 by the First International Conference of American States as a Bureau of Commercial Information intended to strengthen commercial ties between the republics. The bureau was at first under the supervision of the secretary of state of the United States. In 1902 at the second Pan American conference, it was placed under the control of a governing board which consists of the diplomatic representatives of the twenty Latin American republics at Washington and the secretary of state of the United States. In 1910 at the fourth conference the name was changed to "The Pan American Union."

The Union is supported by annual contributions from the member countries in amounts proportional to their population. Its headquarters is the beautiful Pan American Building in Washington, D. C. Its work may be considered from three different viewpoints.

First, as the permanent organ of the International Conference of American States. In this capacity the Union prepares the program for each conference and the documentary material for the use of the dele-

gates. It assists in obtaining ratification of the treaties and conventions signed, serves as a depository for the documents of ratification, and acts to give effect to the resolutions adopted. It also conducts special inquiries and investigations, and arranges special or technical conferences in the intervals between the international conferences.

Second, as the cooperating medium of the member governments, the organization furnishes information on any subject required by any of the governments.

Third, the Union answers thousands of inquiries from the public each year on every phase of agriculture, commerce and industry, intellectual and cultural activities, and public welfare. It issues a monthly *Bulletin of the Pan American Union* in English, Spanish, and Portuguese, reporting the progress of affairs in the American republics, and publishes pamphlets on each of the countries that belong to the Union, on their chief cities, and on their characteristic products.

As one of its outstanding events, the Union observes Pan American Day—"Day of the Americas"—which commemorates each year the bonds uniting the republics of the Western Hemisphere. The president of the United States annually proclaims April 14 as Pan American Day and calls on the people

to observe the Day with appropriate ceremonies, thereby giving expression to the spirit of continental solidarity and to the sentiments of cordiality and friendly feeling which the government and people of the United States entertain toward the peoples and governments of the other republics of the American Continent.

The presidents of all the other countries of the Pan American Union issue similar proclamations. This event is celebrated by the delegates to the Union in its Hall of Americas with speeches and a program of Latin American music.

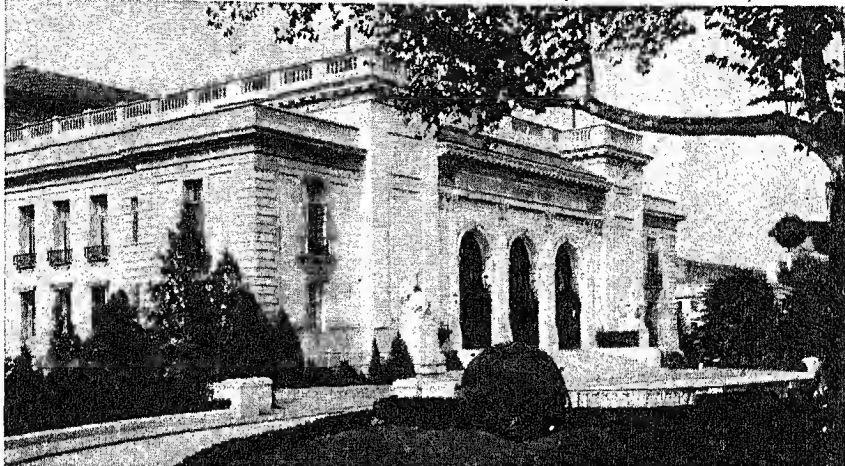
Books About Latin America

THERE IS an increasing number of books on Latin America. Here is room only for a few of those that are dependable and accessible. An annotated bibliography of books in English, Spanish, and Portuguese is found in *'Latin America; Its Place in World Life'*, by S. G. Inman (Willet, 1937). This book provides an authoritative survey of Latin American people, history, and social and political life. It includes such present-day activities as student, labor, economic, and literary movements.

Of the many good histories, three are: *'The People and Politics of Latin America'*, by M. W. Williams (Ginn, 1938); *'Latin America'*, by F. A. Kirkpatrick (Macmillan, 1939); and *'An Introduction to Hispanic American History'*, by

T. B. Jones (Harper, 1939). An excellent study of racial psychology is *'History of Iberian Civilization'*, by J. P. Oliveira Martins (Oxford, 1930). A popular description of recent archeological discoveries with light on the American aborigines is *'Ancient Americans; the Archeological Story of Two Continents'*, by E. C. Davie (Holt, 1931). *'Day of Immense Sun'*, by Blair Niles (Bobbs, 1936), is a reliable historical novel about Inca civilization. *'The Black Mountain'*, by Alan Hillgarth (Knopf, 1934), is a good story

HEADQUARTERS OF PAN AMERICAN UNION, WASHINGTON, D. C.



Here, representatives of the 21 American republics carry on their work of preparing the program for Pan American conferences and furnishing information to their governments and the public.

describing the struggle between Indian and Spanish blood in Bolivia. Younger readers will enjoy *'Neighbors to the South'*, by Della Goetz (Harcourt, 1941).

How Latin Americans interpret their own history and problems may be seen in *'Latin America: Its Rise and Progress'*, by F. G. Calderon (Scribner, 1913). The idealism of Latin America is interpreted in an English translation of one of the most famous books in Spanish, *'Ariel'*, by J. E. Rodó (Houghton, 1922). Everyone should read this classic. *'Concerning Latin American Culture'* (Columbia Univ. Press, 1940) is a valuable collection of papers edited by C. C. Griffin. An outline of the educational systems is found in *'Education in Latin America'*, by H. L. Smith and Harold Littell (Amer. Bk. Co., 1934).

A simple, trustworthy, and inexpensive handbook for general reference is *'Latin America'*, by S. P. H. Duggan (World Peace Foundation, 1936). Economic questions are ably presented in *'Commerce of South America'*, by C. F. Jones (Ginn, 1928), and *'Migration of Industry to South America'*, by D. M. Phelps (McGraw, 1936). Relations between the United States and Latin America are discussed in *'South America Looks at the United States'*, by C. H. Haring (Macmillan, 1928); *'Autopsy of the Monroe Doctrine'*, by Gaston Nerval (Macmillan, 1934); and *'Hispano-American Relations with the United States'*, by W. S. Robertson (Oxford, 1923). The Caribbean countries are treated in *'Trailing the Conquistadores'*, by S. G. Inman (Missionary Educ. Movement, 1930) and *'The United States and the Caribbean Area'*, by D. G. Munro (World Peace Foundation, 1934).

The propaganda and trade drive of the fascist countries is dramatically pictured in *'The Coming Struggle for Latin America'*, by Carleton Beals (Lippincott, 1938). Other books dealing with recent political and economic developments are *'Americas to the South'*, by J. T. Whitaker (Macmillan, 1939), and *'South American Primer'*, by K. C. Carr (Reynal, 1939).

There are many pamphlets dealing with present problems, published by such agencies as the Carnegie Endowment for International Peace, the Foreign Policy Association, and the Pan American Union. For other titles, see the bibliography at the end of the article South America.

FOUR CENTURIES of Literature in LATIN AMERICA

LATIN AMERICAN LITERATURE. The literature of Latin America is older than that of the United States. Education and the arts flourished in Mexico and Peru while New England was still a wilderness. The first book published in America was printed in Mexico City about 1539, more than 80 years before the Pilgrims landed on Plymouth Rock.

In many respects the literature of Latin America is very different from that of the United States. It is written in Spanish, Portuguese, and French. Its backgrounds are the high Andes, the steaming jungles of the Amazon, or the Argentine Pampa. Its characters are the descendants of the Spanish conquistadors, the half-tamed Indians of the jungle, or the picturesque *gauchos* (cowboys) of the South American plains.

But in spite of these differences the literatures of North and South America have something in common. Latin America, like the United States, is a new world. Its writers use the language of ancient Spain or Portugal, as writers in the United States use the language of old England. But in both cases the old tongue is used to describe new scenes, to picture new ways of life, to express new points of view.

The Colonial Period

At the beginning there was little in this literature that was American. Many books were written in Latin America during the colonial period. But they were simply Spanish or Portuguese books which happened to be written in America. The poets and historians who clustered around the magnificent vice-regal courts at Mexico City and Lima were bound by the rigid traditions of the Old World.

Some of the histories were written by the priests who came to America with the conquistadors. The most famous of the historian-priests was Fray Bartolomé de las Casas (*see Las Casas*). His 'Historia de las Indias' was a plea for better treatment of the natives. Another interesting historical work was the 'Comentarios Reales' of Garcilaso de la Vega. This writer's mother was an Inca princess. His book gives a picture of the Spanish conquest from the native point of view.

Epic poems about the heroic deeds of great soldiers and grandes were popular in Spain at this time. The taste spread to the Spanish colonies in America. A poem of this sort, 'La Araucana', published in 1569 by Alonso de Ercilla y Zúñiga, has been called the first important literary work to be written in America. It is based on the author's personal adventures and tells of the wars between the Spaniards and the Araucanian Indians in what is now Chile. This has become almost the national poem of Chile.

The Stimulus of Independence

The colonial period ended about 1810. The ideas of liberty and democracy, which had already brought about the American and French revolutions, began to penetrate into Latin America. Between 1810 and 1826

one colony after another gained independence. Finally only Cuba and Puerto Rico were left to Spain. In this period of disorder and warfare, patriotic poets sang of freedom and of the great deeds of the liberators, Bolívar and San Martín. This verse was inspiring at the time, but most of it cannot be called good poetry. The fighters for liberty had little time for literature.

Brazil was the only exception. Brazil belonged to Portugal, not to Spain, and it won independence without fighting for it. The Brazilians, therefore, had more leisure to cultivate the arts. For much of this period Rio de Janeiro was the cultural center of Latin America.

Independence gave a new impetus to literary activity and inspired the beginnings of national literatures. Freed from Spanish and Portuguese domination in culture as in government, writers turned elsewhere for inspiration and leadership. Most of them looked to France. They read Victor Hugo and the other French writers of the romantic school. Adopting a romantic style themselves, they filled their poetry with sentimental emotion. More than ever before they wrote on American subjects; but the French influence meant that they were still looking at America through European eyes.

The four outstanding writers of this period were José Joaquín de Olmedo (Ecuador), Andrés Bello (Venezuela-Chile), José María Heredia (Cuba), and Olegario Víctor Andrade (Argentina). Bello was less of a romantic than the others. He believed in the old Spanish classicism.

To these four great names may be added that of José Hernández. His poem 'Martín Fierro' was in a sense the first really American book to appear in Latin America. It is a long narrative poem of the *gauchos* of the Argentine Pampa. It is still widely read, but it is chiefly important as the first example of native American literature.

The Modernist Revolt

The romantic period ended in 1888. In that year the Nicaraguan writer Rubén Darío published his book 'Azúl'. This marked the beginning of what is known as the *Modernista*, or modernist, movement. This was a revolt both against romanticism and against the dominance of Europe.

The modernists introduced a new clearness, simplicity, and beauty into the writing of prose as well as poetry. Freedom and individualism took the place of the old, blind copying of European models. They became conscious of the fact that they were living in a new world and creating a new literature. They wrote now from within America. And it was the American continent they saw, not any one country. Many of them began to preach the ideal of Pan Americanism. But most of them were suspicious of the United States. They feared the power of the "Colossus of the North." Their Pan Americanism included only Latin America.

Such poets as Rubén Darío, Amado Nervo, Enrique González Martínez, José Santos Chocano, José María Eguren made modern Latin American poetry both individualistic and truly American.

Essayists and Historians

The essayist is second only to the poet in popularity in Latin America. The people of these countries are passionately interested in ideas. A best seller there

elists like the Mexican Mariano Azuela are describing the life of the Mexican peon and soldier in the turbulent period of revolution through which the country is passing. José Eustacio Rivera wrote of the cruel struggle for existence in the dreadful jungles of the Amazon. Ricardo Güiraldes and Rómulo Gallegos have pictured the simple lives of the gaucho on the Argentine Pampa and the rider of the Venezuelan

THEY HELPED TO LIBERATE THEIR LITERATURE FROM EUROPEAN DOMINATION



Heredia



Olmedo



Bello



Andrade

is more likely to be a book on some historical, social, or political subject than a novel.

Bartolomé Mitre, Domingo Faustino Sarmiento, Juan Bautista Alberdi, Juan Montalvo, Ricardo Palma, Manuel González Prada, Francisco García Calderón, José Enrique Rodó—these are some of the outstanding essayists and historians.

Development of the Novel

Novels have been written in Latin America for many years. But the novels too, except for their subjects, were for a long time more European than American. And the novelists were completely overshadowed by the poets. José Mármol's *'Amalia'*, published in 1855, was the first notable South American novel. It is an old-fashioned story of events in Argentina in the first years of independence, under the tyrant Rosas. South America's other outstanding 19th-century novel was Jorge Isaacs' *'María'*. This is a tale of life on a Colombian plantation. But, apart from its setting, it is just a sentimental love story.

The modern Latin American novel began to appear about the beginning of the present century. The growth of cities and the spread of education were opening up a whole new public for books. This public found novels much easier reading than poetry. The result was almost a literary revolution.

The outstanding characteristics of the modern Latin American novel are its vitality and its variety. It is real literature, for most Latin American writers are fine craftsmen. They have discovered the fascinating country which is all about them. They have discovered the inarticulate and neglected Indians and *mestizos* who make up the mass of their people. They have become aware of the problems of these people. These novels therefore have social importance. Nov-

lanos. The Latin American novel promises to be one of the Western Hemisphere's greatest contributions to world literature.

Summary by Countries

All Latin American writers continued to have a great deal in common even after the colonies became independent. But certain distinctive qualities appeared in the different republics. The paragraphs which follow suggest the special features and name the chief writers of each.

ARGENTINA

Argentina has contributed many names to all branches of literature. Olegario Víctor Andrade was its greatest poet. His patriotic, somewhat flamboyant, verses on the glory of Latin America won him much popularity. Three of Latin America's most noted political essayists and historians were Argentinians: Bartolomé Mitre, Domingo Faustino Sarmiento, and Juan Bautista Alberdi.

Carlos María Ocantos is generally considered to be the greatest of Argentine novelists. He wrote a long series of connected stories about life in Buenos Aires, a series somewhat like Balzac's *'Human Comedy'*.

The most original part of Argentine writing is its poetry and fiction about the gaucho and his life on the great plains (Pampa). This subject was first used by José Hernández in his narrative poem *'Martín Fierro'*. Among the many novels which have been written on this theme, Ricardo Güiraldes' *'Don Segundo Sombra'* is notable. Argentina's chief writers are:

Esteban Echeverría (1805-1851)—*'Las Rimas'*.
Juan Bautista Alberdi (1810-1884)—*'Bases y Puntos de Partida para la Organización Política'*.
Domingo Faustino Sarmiento (1811-1888)—*'Facundo, o la Civilización y la Barbarie'*.
José Mármol (1818-1871)—*'Amalia'*.

Bartolomé Mitre (1821-1906)—'La Historia de Belgrano'; 'La Historia de San Martín'.
 José Hernández (1834-1886)—'Martín Fierro'.
 Olegario Víctor Andrade (1841-1882)—'Atlántida, Canto al Porvenir de la Raza Latina en América'; 'Prometeo'.
 Carlos María Ocantos (born 1860)—'León Zaldívar'; 'Don Perfecto'.
 Ricardo Rojas (born 1882)—'El Cristo Invisible'.
 Hugo Wast (Gustavo A. Martínez Zuviría) (born 1883)—'El Desierto de Piedra'.
 Ricardo Güiraldes (1886-1927)—'Don Segundo Sombra'.

BOLIVIA

Only about 15 per cent of Bolivia's population is white; few of the Indians can read or write; and Bolivia is geographically isolated high up in the Andes. These circumstances have hampered its literary development. Benjamín Lenz, Nestor Galindo, and Daniel Calvo were poets of the romantic school. The modernist poet Ricardo Jaimes Freyre was born in Bolivia, but lived for most of his life in Argentina and did much of his work there. Rosendo Villalobos is the best known of contemporary Bolivian poets. Here is a list of the works by these writers:

Nestor Galindo (1830-1865)—'Lágrimas'.
 Daniel Calvo (1832-1880)—'Melancolía'; 'Rimas'.
 Benjamín Lenz (1836-1878)—poems.
 Rosendo Villalobos (born 1859)—'Tic-Tac, a mi Reloj'.
 Ricardo Jaimes Freyre (1870-1933)—'Castalia Bárbara y Otros Poemas'; 'Los Conquistadores'.

BRAZIL

The first Brazilian books were descriptions of the country and its native Indians. Then came the poets, most of them imitating the great Portuguese poet Camoens. The greatest of Brazilian poets was Antonio Gonçalves Dias, who introduced what is known as "Indianism" into his country's literature. Dias had Indian and Negro blood as well as Portuguese. For this reason he may be considered truly representative of the great racial melting-pot which is Brazil.

Brazil has also produced a number of fine novelists. Brazilians were writing truly American, truly Brazilian, novels before the rest of Latin America turned to native subjects. Two outstanding novelists were the Visconde Eschagnolle de Taunay and Euclides da Cunha. Both of these men wrote of the *sertões*, the wild hinterland in the interior of Brazil. Among Brazil's chief writers are:

Antonio Gonçalves Dias (1823-1864)—'Poesías Americanas'.
 José Martiniano de Alencar (1829-1877)—'O Guarany'.
 Joaquim Maria Machado de Assis (1839-1908)—'Yaya Garcia'; 'Memórias Postumas de Braz Cubas'.
 Alfredo Eschagnolle de Taunay (1843-1899)—'Innocência'.
 Manuel de Oliveira Lima (1865-1928)—'Dom João VI no Brasil'.
 Euclides da Cunha (1866-1909)—'Os Sertões'.

CHILE

Chile's most distinguished writers are historians and biographers like Benjamín Vicuña Mackenna, Diego Barros Arana, and Miguel Luis Amunátegui. The best novelists are Alberto Blest Gana, who wrote

about social conditions in the country, and the historical novelist Daniel Barros Grez.

Chile's greatest poet was not a Chilean. Andrés Bello was a Venezuelan who did not move to Chile until he was 48 years old, but who did his best work after that time. Bello was a remarkable man. He was a noted lawyer and educator, as well as a poet. He worked with Bolívar during the wars of independence and served afterward as first rector of the University of Chile. In the top rank among contemporary Latin American poets is Chile's Gabriela Mistral, who writes simple melancholy verses, often with a religious inspiration. Here is a list of the works by Chilean writers:



GABRIELA MISTRAL

Alonso de Ercilla y Zúñiga (1533-1594)—'La Araucana'.
 Andrés Bello (1781-1865)—'Silvas Americanas'; 'Gramática Castellana'.
 Miguel Luis Amunátegui (1828-1888)—biographies.
 Diego Barros Arana (1830-1907)—'Historia General de Chile'.
 Benjamín Vicuña Mackenna (1831-1886)—histories, biographies.
 Alberto Blest Gana (1831-1920)—'Martín Rivas'.
 Daniel Barros Grez (1834-1904)—'Pipiolos y Pelucones'.
 José Antonio Soffia (1843-1884)—'Bolívar y San Martín'.
 José Toribio Medina (1852-1930)—bibliographic works.
 Eduardo Barrios (born 1884)—'El Hermano Asuo'.
 Gabriela Mistral (Lucila Godoy Alcayaga) (born 1889)—'Desolación'.

COLOMBIA

Colombians like to call their capital Bogotá the "Athens of America." Even the politicians in this republic are likely to be poets, and the poets often become politicians.

José Asunción Silva's nobly pessimistic voice inspired Rubén Darío and thus helped to launch the modernist movement. Among Colombia's other great poets were José Eusebio Caro, who has been called the "Puritan of South American literature," and Julio Arboleda, who mixed poetry with politics and died at the hands of an assassin. The austere Guillermo Valencia is an important recent poet.

'María', a sentimental description of life on a Colombian plantation, by Jorge Isaacs, was one of South America's first notable novels. José Eustacio Rivera's 'La Vorágine', a novel of the Amazonian forest, ranks high in the new school of native fiction. Among Colombia's chief writers are:

Eugenio Díaz Castro (1804-1865)—'Manuela'.
 José Eusebio Caro (1817-1853)—poems.
 Julio Arboleda (1817-1862)—poems.
 Gregorio Gutiérrez González (1826-1872)—poems.
 Jorge Isaacs (1837-1895)—'María'.
 José Asunción Silva (1865-1896)—poems.
 Guillermo Valencia (1873-1943)—poems.
 José Eustacio Rivera (1889-1928)—'La Vorágine'.

COSTA RICA

A great deal of poetry is written in the five small republics of Central America, but little of it is ever heard of in the outside world. When a good poet appears, he is likely to seek broader opportunities in

larger countries. This is true even of Costa Rica, whose orderliness and high degree of literacy are in marked contrast with the turbulency of its little neighbors. Emilio Pacheco Cooper (born 1865), Carlos Gagini (1865-1929), and Rafael Machado Jáuregui (1834-?) are probably the best known Costa Rican poets. Aquileo J. Echeverría (1866-1909) attracted some attention among the modernists.

CUBA

Cuba's long continued servitude to Spain and its struggle for freedom have colored much of its poetry. The best Cuban poet, and one of the finest that Latin America has produced, was José María Heredia. Heredia's life was a short one (he died at 36) and he spent part of it in unhappy exile in the United States. But he had time to write many splendid poems of nature and of patriotism. The revolutionary leader José Martí also wrote poetry, but he is better known for his brilliant and eloquent prose.

Cuba's best-known woman poet, Gertrudis Gómez de Avellaneda y Arteaga, was not, like most of her fellows, a revolutionary. She lived most of her life in Spain, where she devoted herself to writing lyric poems and poetic dramas. Here is a list of Cuba's chief writers and their works:

José María Heredia (1803-1839)—poems.
Gertrudis Gómez de Avellaneda y Arteaga (1814-1873)—*'Baltasar'; 'Saul'; 'Alfonso Munio'*.
Juan Clemente Zenea (1832-1871)—*'Cantos de la Tarde'*.
José Martí (1853-1895)—poems, essays, speeches.
Julián del Casal (1863-1893)—poems.

DOMINICAN REPUBLIC

The small and turbulent Dominican Republic, which shares with Haiti the Caribbean island of Santo Domingo, has a notable literary record.

The country has produced one remarkable literary family. Doña Salomé Ureña de Henríquez was a distinguished poet, an educator, and a leader of Dominican intellectual life. She married Francisco Henríquez, also a writer, who was at one time president of the republic. Their sons, Pedro and Max Henríquez Ureña, became two of the outstanding figures in their country's later literary history.

The great Puerto Rican thinker and educator Eugenio María de Hostos spent much time in the Dominican Republic. The Henríquez family helped him to introduce new educational methods there. They and their friends established one of the most fruitful intellectual movements in Latin America. The best-known writers include the following:

Félix María del Monte (1819-1899)—poems.
Manuel de Jesús Galván (1834-1911)—*'Enriquillo'*.
José Joaquín Pérez (1845-1900)—*'Fantasías Indígenas'*.
Salomé Ureña de Henríquez (1850-1897)—poems.
Fabio Fiallo (born 1865)—poems.
Pedro Henríquez Ureña (born 1884)—*'El Nacimiento de Dionisos'; 'Antología Dominicana'*.
Max Henríquez Ureña (born 1885)—poems, literary history.

ECUADOR

Ecuador contributed to Latin American literature one of the first and greatest of its modern poets. José Joaquín de Olmedo fought with Bolívar for the inde-

pendence of South America. After the battles of Junín and Ayacucho, which broke the Spanish power in the northern part of the continent, he wrote *'La Victoria de Junín, Canto a Bolívar'*. The keynote of this fine rhetorical poem was patriotism and Pan American unity. Olmedo, unlike many Latin American poets, included the United States as well as Latin America in his Pan Americanism. Ecuador has produced other good writers but Olmedo overshadows them all. Among its chief writers are:

José Joaquín de Olmedo (1780-1847)—*'La Victoria de Junín, Canto a Bolívar'*.
Numa Pompilio Llona (1832-1907)—*'Los Caballeros del Apocalipsis'; 'La Odisea del Alma'*.
Juan León Mera (1832-1894)—*'Cumandá'; 'La Virgen del Sol'*.
Juan Montalvo (1832-1889)—*'Siete Tratados'*.
Victor Manuel Rendón (1859-1940)—*'Obras Dramáticas'*.

GUATEMALA

There are four outstanding figures in Guatemalan literature. Although Antonio José de Irisarri was active in the revolution against Spain and later held many public offices, his pen was never idle. He wrote verse, political articles, and essays on grammar and philology. José de Batres y Montúfar was a poet whose best-known work *'Tradiciones de Guatemala'* consists of three humorously scandalous stories told in verse. Juan Diéguez y Olaverri was a popular poet of the romantic period. José Milla y Vidaurre (Salomé Gil), historian and novelist, was Guatemala's outstanding prose writer. Here is a list of the works by these writers:

Antonio José de Irisarri (1786-1868)—*'Poesías Satíricas y Burlescas'; 'Cuestiones Filológicas'*.
José de Batres y Montúfar (1809-1844)—*'Tradiciones de Guatemala'*.
Juan Diéguez y Olaverri (1813-1866)—*'Las Tardes de Abril'; 'A la Independencia'; 'La Garza'*.
José Milla y Vidaurre (Salomé Gil) (1827-1882)—*'Historia de la América Central'; 'Don Bonifacio'*.

HAITI

Haiti, which shares the island of Santo Domingo with the Dominican Republic, is a Negro republic whose people speak French. The bulk of the Haitians are miserably poor and ignorant. But the small ruling class is highly cultured, and Haiti has many poets, writing like Frenchmen, yet with a strong strain of Africa in their work. An anthology of Haitian prose and poetry was awarded a prize some years ago by the French Academy, but the work of Haitian writers is little known outside of their own country. The republic's chief claim to literary fame is probably the fact that Alexandre Dumas, the great French novelist, was of Haitian parentage. Its best-known writers are Démesar Delorme (1833-?), Frédéric Marcelin (born 1852), George Sylvain (born 1866), Massillon Coicou (born 1867), and Léon Laleau.

HONDURAS

Honduras is another Central American republic with a sparse literary product. Alberto Membreño (1859-1921), politician, diplomat, scholar, is the commanding figure in Honduran letters. José Cecilio del Valle (1780-1834), the scholar José Trinidad Reyes

(1797-1855), the orator Ramón Rosa (1848-1893), and the poet Juan Ramón Molina (1875-1908) are other leading writers.

MEXICO

Mexico has one of the oldest, richest, and most varied of Latin American literatures. It stretches from the songs of the 17th-century nun, Sor Juana Inés de la Cruz, to today's revolutionary social novelists. There is an undertone of sadness in almost all Latin American literature. But this is particularly marked in Mexican writing. It comes partly from the strong Indian strain. The mingling of white and Indian blood has come closer in Mexico than anywhere else in America to creating a new race.

The most important of Mexico's poets in the romantic period were the poetic dramatist Ignacio Rodríguez Galván and the sonneteer Manuel José Othón. The musical and melancholy Manuel Gutiérrez Nájera also wrote in this period. But he wrote with more grace and lightness than most of the romantics. He was really a forerunner of the modernists. One of the greatest of the modernists, Amado Nervo, was also a Mexican. Nervo wrote simple, tender songs of great freshness and beauty.

Mexico has a long list of novelists, too. But its most important fiction has sprung up since 1912, when the Mexican revolution began. Such men as Mariano Azuela, Martín Luis Guzmán and Gregorio López y Fuentes are writing vividly of the revolution and of the life of the humble peons who are still fighting that revolution. Mexico's best-known writers are:

Juana Inés de la Cruz (1651-1695)—'Inundación Castálida'. Justo Sierra (1814-1861)—'La Hija del Judío'. Ignacio Rodríguez Galván (1816-1842)—'Múñoz'; 'Visitador de México'.

Rafael Delgado (1853-1914)—'Angelina'; 'Calandria'.

Salvador Díaz Mirón (1853-1928)—poems.

Manuel José Othón (1858-1906)—'Noche Rústica de Walpurgis'; 'Sinfonía Dramática'.

Manuel Gutiérrez Nájera (1859-1895)—'Para Entonces'.

Federico Gamboa (1864-1929)—'Suprema Ley'.

Amado Nervo (1870-1919)—'Epitalamio'.

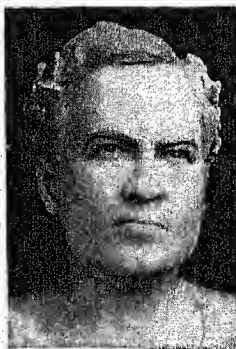
Mariano Azuela (born 1873)—'Los de Abajo'; 'Marcela'.

Martín Luis Guzmán (born 1890)—'El Águila y la Serpiente'; 'La Sombra del Caudillo'.

Gregorio López y Fuentes (born 1897)—'El Indio'.

NICARAGUA

Nicaragua has produced only one writer of consequence. But Rubén Darío (1867-1916) was a writer great enough to assure literary immortality to any country. The founder of the modernist movement was a child prodigy. He could read when he was three years old. At 13 he was writing poetry for the newspapers. His unhappy childhood and the unfortunate love affairs of his later wandering life left their marks on his prose and poetry. He created a new style and turned the whole course of Latin American literature in a new direction. His chief works are 'Azúl', 'Prosas Profanas', and 'Cantos de Vida y Esperanza'.



RUBÉN DARÍO

PANAMA

Panama has been a separate country for less than 30 years. Before that it was part of Colombia. It may therefore be given a share in Colombian literature. It has not had time to develop a national literature of its own.

PARAGUAY

Paraguay is in much the same situation as Bolivia. It is largely Indian in population and even more isolated than Bolivia. It has been engaged in an almost continuous series of wars since it became independent. Thus it has contributed little to literature. During the past few years Juan E. O'Leary (born 1880) has been writing history and Juan Stefanich (born 1889) poetry, while Juan Natalicio González has produced the nationalistic, anti-imperialistic work, 'Paraguay Heroico'.

PERU

The most noted of Peruvian prose writers was Ricardo Palma. He created what was almost a new type of literature. The nine volumes of his 'Tradiciones Peruanas' are a mixture of history and fiction. They are made up of tales and anecdotes from Peruvian history, many of them amusing, all of them delightfully written. Unlike most Latin Americans, Palma was a cheerful writer.

José Santos Chocano, Manuel González Prada, and José María Eguren are the outstanding names in Peruvian poetry. Chocano was second only to Darío among the great modernists. Among the modern prose writers are Francisco García Calderón, brilliant historian and political essayist, and José Carlos Mariátegui, one of South America's leading radical authors. Here is a list of works by Peruvian writers:

Ricardo Palma (1833-1919)—'Tradiciones Peruanas'.

José Santos Chocano (1875-1934)—'El Canto del Porvenir'.

José María Eguren (born 1882)—'Poesías Simbólicas'.

Francisco García Calderón (born 1883)—'Hombres e Ideas de Nuestro Tiempo'; 'Profesores de Idealismo'.

Manuel González Prada (1884-1918)—'Pájaros Libres'.

José Carlos Mariátegui (1895-1930)—'La Escena Contemporánea'.

EL SALVADOR

El Salvador has had two poets who deserve mention. Juan José Bernal (born 1841-?) was a mystic nature-poet. Juan José Cañas (1826-1900) sang sentimental patriotic songs. Most of them grew out of his own experiences in the California gold rush and in fighting against the filibusterer William Walker.

URUGUAY

Uruguay is a small country with a rich literature. Juan Zorilla de San Martín is the greatest of all Uruguayan poets. His best-known work is a long poem, 'Tabaré', describing the tragic love of a half-breed Indian for a Spanish girl.

Eduardo Acevedo Díaz heads the list of novelists with his pleasant romance 'Brenda' and his novels of gauchos and Indians. Carlos Reyles is the leading

modern novelist. He deals with the tragic, sordid side of Uruguayan life.

But foremost of all Uruguayan writers, known all over the world, was José Enrique Rodó, the essayist. He wrote much and brilliantly on social and political subjects. His most famous work is the slim little volume 'Ariel'. This is a message to Latin American youth which has been a bible to Spanish-speaking young people for several generations. In 'Ariel' Rodó contrasts the idealism of Latin America with the materialism of the United States. Rodó's attitude is one-sided and rather unfair. But 'Ariel' is the key to the way many Latin Americans feel about the United States. Among Uruguay's chief writers are: Alejandro Magariños Cervantes (1825-1893)—'Caramurú'. Eduardo Acevedo Díaz (1851-1921)—'Brenda'. Juan Zorilla de San Martín (1855-1931)—'Tabaré'; 'La Leyenda Patria'. Carlos Reyles (1868-1938)—'Beba'; 'El Embrujo de Sevilla'. José Enrique Rodó (1872-1917)—'Ariel'; 'El Mirador de Próspero'. Javier de Viana (1872-1927)—'Yuyos'. Julio Herrera y Reissig (1875-1910)—'Los Peregrinos de Piedra'.

VENEZUELA

Venezuela was one of the first countries in which realistic novels about social and political life became popular. Early leaders of this school were Gonzalo

Picón-Febres and Manuel Díaz Rodríguez. Two of the most noted of contemporary Latin American novelists are Venezuelans. Rómulo Gallegos writes dramatic novels of the llanos. Rufino Blanco-Fombona is a poet and a vigorous critic, as well as a novelist. Here is a list of works by Venezuelan writers:

José Antonio Maitín (1804-1874)—'El Máscara'.
Juan Antonio Pérez Bonalde (1846-1892)—'Poema del Niágara'.
Gonzalo Picón-Febres (1860-1918)—'El Sargento Felipe'.
Manuel Díaz Rodríguez (born 1868)—'Ídolos Rotos'.
Rufino Blanco-Fombona (born 1874)—'La Lámpara de Aladino'; 'El Hombre de Hierro'; 'El Hombre de Oro'.
Rómulo Gallegos (born 1882)—'Doña Bárbara'; 'Pobre Negro'.

Bibliography

The only full-length history of Latin American literature in English is A. Coester's 'The Literary History of Spanish America' (Macmillan, 1928). This does not include Brazil, which is covered in Isaac Goldberg's 'Brazilian Literature' (Knopf, 1922). In his 'Studies in Latin American Literature' (Brentano, 1920), Mr. Goldberg discusses the more important modern writers of Latin America.

There are chapters on Latin American literature in Mary W. William's 'The People and Politics of Latin America' (Ginn, 1928); 'The Republics of South America' (Oxford, 1937), published by the Royal Institute of International Affairs; William R. Shepherd's 'Latin America' (Holt, 1924); and J. D. M. Ford's 'Main Currents of Spanish Literature' (Holt, 1919).

The MOTHER-TONGUE of the CIVILIZED WORLD

LATIN LANGUAGE AND LITERATURE.

When people nowadays talk of inventing a world language, the idea sounds visionary to many of us. But such a language really existed for many centuries—from just before the dawn of the Christian era almost to our own times. This world language was Latin. It began its cosmopolitan career as a conquering tongue by following the victorious Roman legions over Europe, Asia, and Africa, until at length it became the speech of civilization, and was spoken in one form or another from the British Isles to the Persian Gulf.

In the mouths of the unlearned and careless majority, the Latin of everyday life kept steadily changing in pronunciation, grammar, and vocabulary. Thus various dialects grew up in different localities, which in the course of a few centuries developed into the group of related tongues called the "Romance languages" (see Romance Languages). But literary Latin, which remained the language of religious and political life as well as the language of scholarship, underwent little change. In the Middle Ages scholars, priests, and statesmen could travel the length of

NO one who is ignorant of Latin can be called educated, for without it we have not complete mastery even of our own language, and the foundations of half of human knowledge are a sealed book to us. The whole structure of our civilization is based on the creations of Latin genius, which we can understand only imperfectly without knowing its language. For, to quote the eloquent words of J. W. Mackail, "It is in their literature that the inner spirit of the Latin race found its most complete expression. In the stately structure of that imperial language they embodied those qualities which make the Roman name most abidingly great—honor, temperate wisdom, humanity, courtesy, magnanimity; and the civilized world still returns to that fountain-head, and finds a second mother-tongue in the speech of Cicero and Vergil."

Europe without learning the languages of the various countries, since in every community there were sure to be men of learning who talked Latin; and state documents, as well as scientific, philosophical, and other works of scholarship were written exclusively in Latin.

Even today Latin is something of a world language, though in a different way. One-third of the English that we write is Latin, and we can hardly speak a sentence without using some such words as "wall," "street," "city," "army," "justice," "religion," and thousands of others that we have inherited from the ancient Romans (see English Language). In the Romance languages of Europe—Italian, French, Spanish, and the like—the proportion of Latin words is even higher than in English.

In the Indo-European family of languages, Latin is a younger sister to Sanskrit and Greek. (See Philology.) At the time when Greece was creating the greatest poetry of all time, Latin was still only a dialect spoken by a few tribes in the vicinity of Rome. And it was not until the 3d century B.C. that it had been planted throughout Italy, superseding for the

most part the other Italic dialects; and not until the first century that it had been developed into a superb literary language, a marvelous instrument for prose and poetry. The Latin of this so-called Golden Age had a stateliness and an artistic finish of style that have never been surpassed in any tongue. The masters knew the limitations of their instrument. Latin was not adapted to expressing fine shades of meaning; therefore the great Roman writers strove rather for clearness and precision. It had not the variety of sound that Greek possessed through its more numerous vowels and diphthongs and its musical accent, and the monotony of Latin was further increased by the great number of long syllables. But this very monotony in the right hands gave weight and dignity, and a beautiful rhythmic cadence.

The Beginnings of Literature

Just what Latin literature might have become if it had been left to itself, as the Greek was, we shall never know. Certainly it would have been very different. Before the invasion of Greek culture that followed the Roman capture of Tarentum, the greatest of the Greek colonies in southern Italy (272 B.C.), the Romans had developed a meter of their own and the beginnings of a literary form. Their so-called Saturnian verse was apparently based upon accent as our verse forms are, and was a vigorous, rough-and-ready line capable of adaptation to a variety of poetical purposes. The Greek measures which Latin afterward imitated were based not on accent but upon long and short syllables.

In the languages of many uncivilized peoples nowadays the first written book is a translation of the Bible. In Rome the first book seems to have been a translation of the 'Odyssey'. This was made in the latter half of the 3d century B.C. by a Greek, Livius Andronicus, who was brought to Rome as a slave after the capture of Tarentum. Andronicus translated some Greek plays as well. The next poet, Gnaeus Naevius (died about 200 B.C.), went on translating or imitating Greek drama, often using subjects from Roman history and introducing allusion to contemporary politics. He made use also of the pattern given by Andronicus' 'Odyssey' to write an epic of the first Punic war. Thus, from the very beginnings Roman literature was based on Greek models.

On this foundation Quintus Ennius (239-169 B.C.), the most important Roman writer before the age of Cicero, reared the stately edifice of his 'Annales'—a tremendous epic history of the Roman state, which is unfortunately known to us by only a few fragments. In this poem Ennius remolded the still rude and clumsy Latin to fit the stately flow of the Greek hexameter verse form (see Greek Language and Literature), thus influencing the whole later history of the language. A tireless and prolific worker, Ennius also produced an astonishing number of translations from the Greek tragedy and comedy, as well as many original dramas, and other works which won for him the title "father of Roman poetry."

The first Latin writer whose works have survived in any considerable body is Titus Maccius Plautus (254?-184 B.C.), the greatest comic dramatist of Rome. Twenty of his farcical plays have been preserved more or less intact across the hazards of the centuries, making him one of the world's chief dramatic influences. His plots—which he borrowed from the later Greek comic poets—have in turn furnished a rich mine for later playwrights, including Shakespeare and Molière; and many of the stock characters of the comic stage of today are mere adaptations of the types which he took from Greek comedy.

Though Plautus got the substance of his plots and characters from Greek sources, his manner and spirit were essentially Roman. His great successor Terence, who was born about the year Plautus died, avoided as a blemish any impulse toward originality or the expression of national quality, and set himself to copy his Greek originals with slavish fidelity. There is nothing Italian about his work but the language. His merit is that he thus brought into Roman literature the Greek standards of elegance, artistic perfection, and moderation; his defect, that he "struck Latin literature at the root with the fatal disease of mediocrity." His six plays, which all survive, have served as models of classical perfection to every generation of playwrights since, and some of his exquisitely polished lines, such as *Homo sum: humani nihil a me alienum puto* ("I am a man; and I think nothing pertaining to mankind foreign to me") have passed into the currency of common speech.

In addition to these poets, we have crusty old Cato the Censor (234-149 B.C.), who was the first writer of prose history in Rome to use his native tongue, and whose published speeches Cicero sincerely admired; and Lucilius (about 180-103 B.C.), who wrote the first satires that were satires in the modern sense of witty social criticism. These are all the names we need to remember from the early period of Latin literature.

The Golden Age

The Golden Age, as we call the period when Latin literature reached its greatest splendor, covers about a century (80 B.C.-14 A.D.), from the beginning of Cicero's rise as an orator to the death of the Emperor Augustus, under whose patronage arts and letters flourished as never before in Italy. Cicero brought Latin prose as an instrument for oratorical, philosophical, literary, and epistolary expression to such a pitch of perfection that the adjective "Ciceronian" is a synonym for "classically perfect," "polished." (See Cicero.) In the words of the greatest of modern critics of Latin literature (J. W. Mackail), "Cicero's unique and imperishable glory is that he created a language which remained for 16 centuries the language of the civilized world, and used that language to create a style which 19 centuries have not replaced, and in some respects have hardly altered." Different but in no way inferior to the stately sonorous periods of Cicero was the simple

straightforward style of Caesar, whose 'Gallic Wars', recording his campaign in Gaul, will ever remain a model of prose narration (see Caesar).

The other chief writers of the Ciceronian period are Sallust, Lucretius, and Catullus. Sallust (86-34 B.C.) is placed in the front rank of Roman historians by the accounts he has left us of the Catilinarian conspiracy and the Jugurthine war. The philosophical epic *De rerum natura* ("Concerning the Nature of Things") of Lucretius (96?-55 B.C.) is perhaps the most original and certainly next to the 'Aeneid' the greatest poem in Latin. The love poems of Catullus (84-54 B.C.) present the joy and pain of the passing moment with the same vividness that we find in the sonnets of Shakespeare.

With these names we pass from the literature of the Roman Republic to that of the Empire. As the giants of the Ciceronian period had perfected Latin prose, so their later contemporaries of the Augustan age perfected Latin verse. First of these both in time and genius was Vergil (70-19 B.C.), "the Homer of Rome." His great national epic, the 'Aeneid', is one of the supreme masterpieces of the world, yielding place only to the matchless 'Iliad' and 'Odyssey'. In his hands the Latin hexameter became "the stateliest measure ever molded by the lips of man," and the unforgettable pictures he wrought—of the last agony of Troy, of the wanderings of the "pious Aeneas," of the tragic passion of the ill-starred Dido—have moved to tears generation after generation as nothing else in all literature has done (see Vergil).

In the field of lyric and satiric verse, the genial and accomplished Horace (Quintus Horatius Flaccus, 65-8 B.C.) triumphed as surpassingly as did Vergil with the epic. He embodied his philosophy of "idealized common sense" in phrases of such unforgettable charm that many of them have become as familiar as proverbs. "The schoolbook of the European world, the 'Odes', have been no less for 19 centuries the companions of mature years and the delight of youth." In his mildly ironical 'Satires' and 'Epistles' he left the most complete and vivid picture we have of life in the Augustan age.

The Elegiac Poets

There was nothing of Horatian self-restraint and even-souled calm in the brief erratic life of Sextus Propertius (50?-15 B.C.) who flashed on the Roman world as a boy of 20 with a volume of passionate colorful poems celebrating his love for the capricious "Cynthia." A gentler and more refined young poet of the same time was Tibullus (54?-19 B.C.) in whom grace and melodiousness took the place of Propertius' fire. These two poets both used the metrical form called the "elegiac," which their brilliant contemporary Ovid (43 B.C.-18 A.D.) polished to the same perfection to which Vergil had brought the hexameter and Horace various lyrical forms. A facile and copious writer, Ovid became the uncrowned laureate of the later Augustan age, whose glittering coldness and cynical worldliness he so perfectly embodied in

his licentious 'Art of Love'. For us the most attractive of his many productions is his romantic 'Metamorphoses'—a fascinating narrative poem as long as the 'Odyssey' in which he has interwoven a vast number of stories from the ancient mythology.

The Augustan age was preëminently the Golden Age of Latin poetry, but to this time belongs also the most famous of the Roman historians. Livy (59 B.C.-17 A.D.) is particularly noted for the splendor of his rhetoric. He preferred literary effectiveness to historical accuracy, so that his narrative of Rome from its founding is more like a prose epic, a series of splendid pictures, than a critical history.

The Silver Age

After Ovid and Livy the decline of Roman literature sets in rapidly. The so-called Silver Age that followed the reign of Augustus is so very literary that it scarcely interests the general reader. All work, whether in prose or verse, suffered from the custom of public readings. The author was tempted into writing brilliant passages to win the praise of his listeners even though he injured his work as a whole.

The satirist Juvenal (60?-140 A.D.) and the epigrammatist Martial (40?-104 A.D.) belong to this later period. Juvenal's savage castigations of Roman life have been translated and imitated by many English poets. These men are chiefly interesting to us today for the picture they give of Roman life in the days of the empire. The tragedies of Seneca—Nero's tutor—with their ghosts and their dismal lack of acting qualities, were the chief models for tragedy, as Plautus and Terence were for comedy, among the early writers of English drama. Today we read them as curiosities, though we can still enjoy Seneca's philosophical studies written in letter form.

Tacitus (55?-120), whose perverse and vivid style has sometimes been compared to that of Carlyle, gives us a number of valuable historical pictures. The 'Germania' is our only view of central Europe under the early Roman Empire. His 'Agricola' is a very beautiful piece of biography. And what remains of his 'Annals' and 'Histories' is our chief source for the events of the first century of the Roman Empire. The historian Suetonius (75?-160), a writer of much less distinction than Tacitus, had the advantage of being one of Hadrian's private secretaries, and could therefore write his very gossipy 'Lives of the Twelve Caesars' from documentary sources.

Perhaps the most interesting writings in Silver Latin are the letters of Pliny the Younger (61?-113). The most famous is the one telling of the death of his uncle Pliny the Elder in the eruption of Vesuvius that buried Pompeii. As a whole these letters give a racy picture of the time that is also pictured in Juvenal and Tacitus. Pliny the Elder (23-79) was the author of a 'Natural History', which is a priceless storehouse of information about the science of ancient times. Two other works of the Silver Age strike a more modern note, the literary criticism of Quintilian and the 'Satyricon', the prose novel of Petronius Arbiter.

With the gradual breakdown of the Roman Empire which followed the death of Marcus Aurelius (180 A.D.) literature almost disappeared. Although there were brief flickers of activity from time to time, the genuine Roman spirit was dead. Latin survived as a learned language—and still survives, for every year sees a considerable output of scholarly research written in Latin—but Latin literature may be said to have ended in the 2d century.

As Latin has never ceased to be spoken as a learned language, its pronunciation has been corrupted by the pronunciation of the various languages of Europe. Thus the name *Cicero* is commonly pronounced in Franco as *Sisero*, in Italy *Chichero*, in England *Sisero*. In most schools of the United States the so-called Roman method of pronunciation is used, which attempts to approximate as nearly as possible to the pronunciation of Cicero's time. This gives the vowels about the same sound as in French and Italian and the consonants C and G are always given their hard sound. Thus the word *Cicero* is pronounced *Kikero*.

LATITUDE AND LONGITUDE. To indicate accurately the position of a place on the surface of the earth, geographers imagine the globe to be covered with a network of lines regularly spaced. Those running east and west—parallel to the Equator—are called "parallels," and the distance between them is measured in "degrees of latitude." Those running north and south—from pole to pole—are called "meridians," and the distance between them is measured in "degrees of longitude." Instead of marking each degree, which would make a confusing network of lines on the map, every fifth or tenth degree only is usually marked. If you examine a map of the United States, you will see that parallels and meridians form the boundaries of many of the states.

In numbering the parallels, we begin with the Equator as zero and count north and south. Thus the first degree north of the Equator is one degree north latitude, usually written "lat. 1° N."; and the first degree south of the Equator is one degree south latitude or "lat. 1° S." Since the distance from the Equator to either of the poles is one-fourth of a circle around the earth, it will measure one-fourth of 360 degrees (the number of equal parts into which a circle is divided), which equals 90 degrees. Thus 90 degrees north latitude marks the position of the North Pole, and 90 degrees south latitude that of the South Pole.

In numbering the meridians most countries by agreement have chosen as the point of departure the meridian passing through Greenwich, England, where the British Royal Observatory was established in 1675. Beginning with this as 0°, the first degree east of Greenwich is called one degree east longitude, or "long. 1° E."; the first degree west is "long. 1°

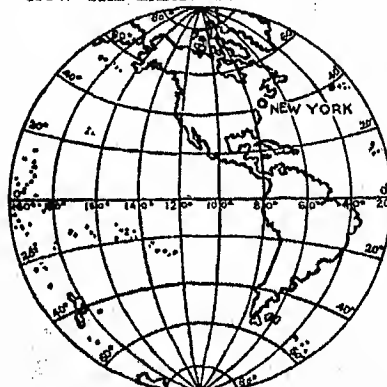
W."; and so on until 180 degrees (half of 360) have been measured off eastward and westward. The 180th meridian is on the other side of the earth, exactly opposite to the one which passes through Greenwich, and with it, it forms one of the great circles which pass through the poles around the earth. This meridian is neither "east" nor "west," for both the east and west counts end here. Other meridians which have at times been used in calculating longitude are the ones passing through Washington (D.C.), Ferro (in the Canary Islands), and Paris (France).

As you can readily see, the circles forming the parallels decrease in size from the Equator to the poles. The meridians all meet at the poles, therefore the North Pole cannot be said to have longitude. It has only latitude (lat. 90° N.), and from there the only direction is south, just as from the South Pole the only possible direction is north. A degree of longitude measured on the Equator is a little more than 69 miles. This distance decreases until at 30° it is a little less than 60 miles, at 60° about 34½ miles, and at the poles, zero. (For table of values, see Longitude.)

A degree of latitude measured from the Equator to the first parallel north or south is about 68¾ miles; but between lat. 45° and lat. 46° it is a little more than 69 miles. If the earth were a perfect sphere the degrees of latitude would, of course, all be an equal distance apart; but the earth is flattened at the poles and bulging at the Equator, which accounts for the difference noted above (see Earth).

The determination of both latitude and longitude depends upon astronomical observations. Latitude is found at sea by measuring with an instrument called

HOW THE EARTH IS SPACED OFF



The imaginary lines encircling the Earth parallel to the Equator (0°) are the Parallels of Latitude, while the lines intersecting at the Poles and numbered in this picture at the Equator are the Meridians of Longitude.

a sextant the sun's angular distance above the horizon when it is at the highest point or "zenith"—that is, at exact noon. From astronomical tables which give the "declination" of the sun (its distance north or south of the Equator for that day) the latitude is then found. One of the simplest ways to compute longitude at sea is by noting the difference in time between that given by the observation of the sun at noon, and that given by a chronometer or watch set to Greenwich time. The longitude is the amount by which noon by Greenwich time is earlier or later than noon at the observer's point; one hour's difference in time means 15° difference in longitude. The wireless telegraph dispatches now enable mariners to keep their watches accurately set to Greenwich time.

Other imaginary lines on the earth's surface are the two tropics—the Tropic of Cancer (23½ degrees north of the Equator) and the Tropic of Capricorn (23½ degrees south of the Equator). These two parallels

mark off the belt around the middle of the earth in which the sun, at some period of every year, is directly overhead. Elsewhere the sun's rays never shine straight down from the zenith. The tropical belt, therefore, is the region of greatest heat.

The polar circles are the same distance from the poles that the tropics are from the Equator. The Arctic Circle, therefore, is $66\frac{1}{2}$ degrees north latitude, and the Antarctic Circle is $66\frac{1}{2}$ degrees south latitude. They mark off the regions around the poles where each year there is at least one day when the sun does not set, but is visible above the horizon for the full 24 hours. (See also Maps.)

LATVIA. Latvia or Letvia—the "land of the Letts"—is one of the three Baltic States that enjoyed brief freedom after the Russian revolution of 1917. It comprises most of the former czarist provinces of Courland and Livonia and lies between Esthonia and Lithuania. The Gulf of Riga makes a deep indentation on the northwest coast. Latvia possesses about 340 miles of seacoast, and there are good harbors at Riga, Libau (or Liepaja), and Windau (or Ventspils). The area of Latvia is 25,402 square miles; population, 1,900,000.

Much of Latvia is low and marshy, though Livonia has wooded hills and pretty lakes. One man, Baron Osten Sacken, used to own all Courland; but after 1917 many of the big estates were divided up, making 87,000 new farms, and rousing a sullen peasantry to a spirited and energetic interest in managing their own affairs.

The Letts, 76 per cent of the population, are, with the Lithuanians, a branch of the Indo-European family, akin to the Slavs. More than half of the people are Lutherans. Much progress has been made in education, stabilizing of industry, and introducing modern ways of life.

Industries, Transportation, and History

Latvia is chiefly an agricultural country, but industries are claiming more workers. Rye, barley, oats, potatoes, and flax are the main crops; timber, flax, and butter the chief exports. It has about 2,000 miles of railroads, the same mileage of inland waterways, and some 600 miles of paved roads.

In the 13th century what is now Latvia was part of the territory conquered and Christianized by crusading Teutonic knights. In the 16th century the region came under Poland's rule. In 1629 Sweden annexed Livonia, but a century later it fell to Russia. Courland was annexed by Russia in the third partition of Poland (1795), and the two provinces formed part of the czar's realm until the Russian revolution of 1917. Then Latvian nationalists rose up, and in November 1918 proclaimed a new republic.

Latvia existed as an independent nation little more than 20 years. In 1939, while most of Europe was engaged in war, Russia exacted important military concessions from Latvia. In July 1940 a newly elected Latvian parliament voted, as did those of Lithuania and Esthonia, to incorporate the nation in Russia as the fifteenth Soviet Republic. (See also Russia.)

LAUNDRY AND DRY-CLEANING. Washing clothes, which used to be a sudsy Monday morning job in the home, is a big thriving industry earning more than \$700,000,000 a year in the United States alone. The laundryman takes your big bag of wash to a modern power laundry equipped to make short, efficient work of what was a backbreaking task for the housewife.

With careful system, the soiled pieces are identified by indelible marks, sorted, and dropped inside the cylinder of a huge washer. The cylinder, of wood, stainless steel, or monel metal, can swish and toss as much as 600 pounds of clothes at one time. It rotates inside a water-filled shell, whirling the clothes through rich suds and dropping them into the bath hundreds of times without ever scouring them over a rubbing board. There are 10 to 12 washings in suds, rinsing water, and bluing water, lasting an hour and a half.

Then the clothes go into a hydro-extractor, a whirling metal basket which spins the water out. "Wet wash" is sent home after it leaves this basket. "Finished service" is starched, dried with hot air, and sent to the ironers. All "flat work," such as towels, table cloths, and sheets, passes between a polished, steam-heated surface and a series of soft padded rolls. Clothing is finished on steam-heated presses and touched up with electric hand irons. Clever work must be done to remove spots and stains, and to bleach the clothes without damaging them. The steam laundry industry and manufacture of laundry machinery were developed chiefly at Troy, N. Y.

The Delicate Work of Dry-Cleaning

Many articles of clothing cannot be washed in water because it would change their shape and color. Silks, velvets, woolen suits and dresses, felt hats, and fine rugs must all go to the dry-cleaner. His is a modern trade, netting a yearly income of about \$150,000,000, including the proceeds from dyeing. All the glittering figures of history—King Solomon in his purple robes, the magnificent Medici of Italy, the brilliant Louis XIV of France, and lace-frilled, gold-embroidered Queen Elizabeth—all of these dabbed at the stains and soils of their velvets and satins with inefficient water, and then went on wearing their finery dirty!

The elegance of today is clean elegance. Near the middle of the 19th century, French cleaners first began to remove grease and dirt with solvents, using benzine and camphene, replaced now chiefly by petroleum naphtha. Today garments are agitated in a metal washer with a clear solvent, then with a soapy solvent. Next they are rinsed in a flow of cleaning fluid and whirled dry as in a laundry. Then stains of fruit, coffee, grease, or ink are removed by expert spotters, and finally the job is pressed and mended. Stains offer a difficult chemical problem to the dry-cleaner. So do "weighted" silks and rayon (see Silk).

There is a growing tendency to combine laundries and dry-cleaning agencies because of the similarity of the services they perform.

LAUREL. The best known species of these hardy shrubs is the American or mountain laurel, which is found from Pennsylvania southward, and is especially abundant in the mountains of the Carolinas and Tennessee. It is a shrub varying from 2 to 20 feet in height. During June and July it bears beautiful white or rose-colored flowers, some of which exhale a pungent perfume. The leaves are rather large and lance-shaped and are shining and leathery.

The bay or sweet laurel (*Laurus nobilis*), having yellowish green flowers, is found in the Mediterranean districts of Europe and in Great Britain. It belongs to the family which includes the sassafras and camphor, trees remarkable for their aromatic qualities. From the berries and other parts of the sweet laurel is distilled an aromatic oil used in the manufacture of toilet waters. The dried leaves also are used for flavoring in cookery and pickling. The ancient Greeks used the entwined twigs of this tree to crown victors of the Pythian games. The tree was sacred to Apollo, and the nymph Daphne when pursued by Apollo was, in answer to her prayers, changed into a laurel. The custom of placing a laurel crown on the brow of poets dates from the Middle Ages.

The mountain laurel belongs, not to the classic old-world laurel family (*Lauraceae*), but to the heath family (*Ericaceae*). The name of laurel is given also to shrubs of the rose and other families. Old-world laurels are found in southern Asia as well as in Mediterranean Europe. Cases of poisoning have been traced to wild honey gathered from the pretty flowers of some species of laurel, while the leaves of other species are deadly to live stock. The beauty of the shrubs makes them popular among gardeners and they are extensively cultivated.

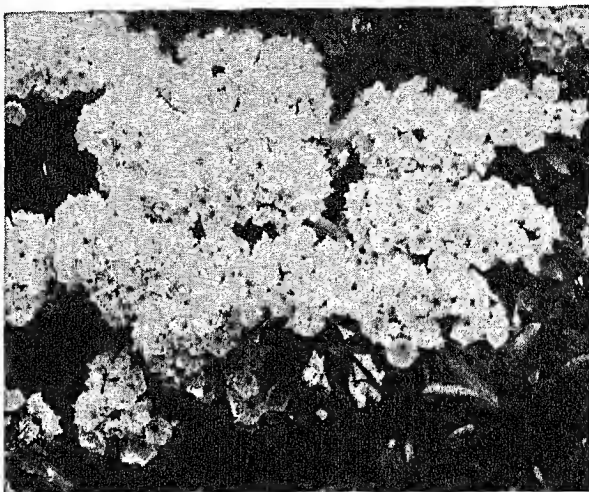
Scientific name of the mountain laurel, *Kalmia latifolia*. Evergreen shrub or treelike plant; leaves bright green, pointed at both ends; flowers numerous, in terminal clusters, varying from white to pink, with one pistil and 10 stamens; round seed capsule; stem hard, smooth, and brownish.

LAURENTIAN PLATEAU. Eastern Canada rests upon some of the oldest rock in the world. This rock, which exists in a vast mass called the Laurentian Plateau, or Canadian Shield, was dry land ages ago when the oceans still rolled over the sites of the Appalachians and the Rockies; and throughout geologic time it has been a firm anchor for the continent. Later it was

uplifted to form a plateau, and then was carved by stream erosion; finally it was planed almost level by mighty glaciers. This combination of uplift and ero-

sion gave eastern Canada its present-day appearance as a rocky tableland, deeply carved by rivers. The Saguenay, a tributary of the St. Lawrence, with great fiordlike cliffs rising in some places to 1,500 and 1,700 feet, has some of the most sublime river scenery in the world, and is yearly visited by thousands of tourists. The Muskoka lake region in Ontario, with almost 1,000 island-dotted lakes and ponds, surrounded by beautiful forest scenery, is another favorite summer resort. The whole plateau is so covered with winding waterways and lakes

THE MOUNTAIN LAUREL IN FULL BLOOM



The small blossoms that make up the showy flower clusters of the Mountain Laurel are from three-fourths of an inch to a full inch across. Many tons of the shiny evergreen foliage of this plant are used each year for Christmas wreaths and other decorations.

that, by making occasional portages, one can travel in almost any direction by canoe.

Shaped like a great "V," with the Hudson Bay in the center, the Laurentian Plateau in the widest use of the term underlies 2 million square miles—more than half of Canada. On the east, it underlies most of Quebec and Labrador; on the south it extends through Ontario as far as Lake Superior and the Adirondack Mountains. Portions of its southern edge are exposed in northern Michigan and Wisconsin. Its north-western edge runs east of the Rocky Mountains to the Arctic Ocean. The whole plateau is tilted like a great slab, with a gentle slope from a clifflike edge in Quebec and Labrador, to sea level around Hudson Bay. In the center a slight dome is traversed by the divide, called the Height of Land, between the St. Lawrence drainage to the Atlantic and the drainage to the northward. Scattered beds of glacial drift, which block old stream beds, have produced a great number of lakes. The average elevation is 1,500 feet, but some parts are 6,000 feet high.

Minerals are of the sort usually found in the granite and other igneous rocks which make up the plateau. No wealth of coal or petroleum exists, but metals are abundant, particularly gold, nickel, copper, platinum, silver, cobalt, and rare metals, including radium. The nickel deposits near Sudbury, Ont., are among the richest in the world.

Thick evergreen forests cover the region as far north as the timber line; the "barren lands" beyond are rarely visited by whites. Great herds of caribou and musk oxen roam this region, and are hunted occasionally by Indians and Eskimos.

LAURIER, SIR WILFRID (1841-1919). The first French-Canadian to become prime minister of Canada, Laurier guided the young Dominion through a 15-year period of amazing development. Though French was his native tongue, he became a master of English oratory, and his eloquence, heightened by his picturesque personality, made him popular throughout Canada.

Laurier was born at St. Lin, Quebec, and studied law at McGill University. In 1874, after serving three years in the Quebec legislature, he was elected to the Canadian House of Commons. His rise in Parliament was rapid. In 1887, though a French-Canadian and a Roman Catholic, he was chosen leader of the Liberal Party, and nine years later he became prime minister.

"Build up Canada" was the watchword of Laurier's government. He was loyal to Great Britain, sent Canadian volunteers to help the mother country in the Boer War, established a tariff favorable to British goods, and worked to establish sympathetic relations between the two countries. But he looked upon the British Empire as an alliance of free and equal nations and he opposed every attempt to limit Canada's freedom. He was knighted in 1897 when he attended the Colonial conference held in London during Queen Victoria's Golden Jubilee.

Laurier's immigration policy brought hundreds of thousands of settlers, and he formed a practical plan for the settlement and development of the western provinces. He reduced postal rates, promoted the building of railroads, and appointed a railway commission to regulate rates. After 15 years in office his government was defeated on the issue of reciprocity in trade with the United States.

Laurier's dearest ambition was to bring about harmony between the French and English in the Dominion, and perhaps his greatest service to his country was his fostering of a national spirit.

LAVA. The more or less completely melted rock discharged from volcanoes is called lava. Molten lava is a very thick fluid permeated with gases and steam. Its fluidity depends on its temperature, the amount of vapors it contains, and its chemical composition. Those lavas which contain not more than 58

per cent of silica are called *basic* lavas, and melt at about 2250° Fahrenheit. Lavas containing 66 per cent or more of silica are *acid* lavas and remain more or less pasty even at 3100°. Lavas of Stromboli in the Lipari Islands (where Vulcan is fabled to have had his forge), the Hawaiian Islands, and Skaptar Jokul in Iceland are basic. Basic lava flows faster than acid lava; hence the cones of such volcanoes are low and have gentle slopes. The lavas from Mt. Shasta, Mt. Hood, and Mt. Rainier on the Pacific coast, and from Vulcano of the Lipari Islands, are acid, and so these mountains have high steep cones. Newly ejected lava may flow as fast as 50 miles an hour, but its speed is soon checked, usually to less than a mile an hour.

OUT OF THE FIERY FURNACE



This is a mass of cooled and hardened lava on the edge of the crater of Kilauea on the island of Hawaii. Queer looking thing, isn't it? But stranger still is the fact that the islands of the Hawaiian group, like many others in the Pacific, were built up in just that way, by the boiling out of lava from the floor of the sea, each successive outburst piling up more and more until at last the top rose above the surface. Countless years of erosion followed before the land could support life.

If acid lava cools too quickly for its minerals to crystallize, it forms glass-like *obsidian*. A partial crystallization results in *rhyolite*. Acid lava having large crystals embedded in a matrix of small crystals is called *porphyry*. Basic lava cooled to a prismatic structure that forms columns and stairs is called *basalt*. The top of lava is often frothy from bubbles of gas. *Pumice* is rock froth light enough to float on water. Powdered pumice is used in grinding glass stoppers for bottles, in making soaps for mechanics, and for polishing various materials. Great quantities are exported from the Lipari Islands. (See Volcanoes.)

LAW. We use the word law with at least three fundamentally different meanings. In its widest sense, law expresses the

relation between cause and effect. Students of the sciences found, after long observation, that natural objects and forces can be depended upon to act in certain ways; these ways are natural laws. Thus the chemist speaks of the law of the conservation of matter; the physicist, of the laws of motion; the biologist, of laws of heredity.

In a narrower sense the word law refers to the social life of man. Thus we speak of laws of etiquette, laws of honor, and the moral law. When people first began to live in groups they had no rules or laws, but they soon realized that each man had to pay attention to the needs and welfare of his neighbors in order to make life not only pleasant but possible for the greatest number. These rules or customs were at first unwritten, and were not always observed. When

law in this second sense failed, when ridicule and ostracism were not effective checks, the state stepped in, making law in a third sense.

Development of Positive Law

The word law is now most commonly used in this stricter or more positive sense of rules or codes, which the state enforces through its political organization. The earliest code of laws that has come down to us is that of Hammurabi, the Babylonian monarch, who lived about 2100 B.C. (see *Babylonia and Assyria*). Sometimes laws proved unsatisfactory and were changed, as for example when the harsh laws of Draco, who compiled the first Athenian code in the 7th century B.C., were displaced by those of Solon (see *Solon*). The Romans, with their genius for government, gradually built up a remarkable body of law based on long-established custom, modified and enlarged by judicial decisions and legislative enactments. This the Emperor Justinian codified in what came to be called the Roman Civil Law. Roman law has determined the general character of the laws of every nation in western Europe except England. (See *Justinian I.*)

Before the Norman invasion of England, each manor, borough, or shire had its rules based on established custom—laws of tradition. After the Normans conquered the island, judges appointed by the king moved from place to place to administer these local laws, and gradually popular custom gave way to judicial custom. As time went on, the decisions of the judges, constantly modified by later decisions, were accepted as the body of English "common law." Except in Louisiana, where the Code Napoleon prevails (see *Louisiana*), civil law in the United States is based on English common law.

Statute Law and Constitutional Law

Statute law, or legislation, is another kind of law which grew up because new conditions arose, to which judge-made or common law did not apply. This is law made by legislative bodies, such as parliaments, congresses, and legislatures. Furthermore, two chief types of law came to be recognized: civil law, which sets forth the rights of persons, with methods for maintaining or regaining them; and criminal law, which deals with actions harmful to the public and the private good, and with punishments for offenders. Constitutional law is the basic law of a state; it provides the framework of the government established under it.

Canon and Martial Law

Canon law arose in the Middle Ages to deal with church matters. The New Code of the Canon Law is a collection of all the disciplinary laws of the Roman Catholic church. Military law is the set of rules used for governing a military organization. Martial law is the suspension of civil laws in time of emergency, such as invasion or insurrection, and the enforcement of

military law on the civilian population. Parliamentary law is not "law." It is merely a body of rules to regulate the procedure of a deliberative group. Jurisprudence is the science of the nature of law and the study and classification of laws. (See *Courts of Justice*; *International Law*; *Jury*; *Parliamentary Law*.)

The law profession is crowded, but many who have had legal training find it an excellent preparation for business. Educational and examination requirements for admission to the bar differ in various states. The American Bar Association standard requires two years of college study followed by three full years in an accredited law school. (See *Vocational Guidance*.)

A list of the terms most commonly used in law will be found with the entry *Law* in the *Fact-Index*.

LAWRENCE, JAMES (1781-1813). "Don't give up the ship!" cried out young Captain Lawrence, commander of the

U. S. frigate *Chesapeake*, as his men were carrying him below, mortally wounded. These words were used later by Captain Perry on his flag at the battle of Lake Erie.

James Lawrence, a native of Burlington, N. J., entered the navy as a "middy" at the age of 17, and rose to the rank of lieutenant in 1802. During the war with the Tripoli pirates (1804-05) he fought in the Mediterranean as second in command to Decatur. At different times he commanded the *Argus*, *Vixen*, *Wasp*, and *Hornet*. As commander of the *Hornet*, early in 1813, he captured the British sloop-of-war *Peacock*, after a spirited 15-minute engagement. For this, Congress gave him a vote of thanks and a gold medal.

A few months later found him in command of a poorly trained crew on the *Chesapeake*. On June 1, 1813, the *Chesapeake* sailed out of Boston Harbor to meet the British frigate *Shannon*. The two vessels were about equal in size and guns, but the crew of the *Shannon* were experienced and well-trained men. Lawrence was courageous, skilful, and energetic, but over-confident. After a short fierce fight, the *Chesapeake* was disabled and Lawrence was fatally

JAMES LAWRENCE



The Man Who Wouldn't Give Up the Ship

wounded. He died a few days later in Halifax, the port where his captured vessel was taken. His body was later returned to the United States and buried with military honors in the yard of Trinity Church, New York City.

LAWRENCE, THOMAS EDWARD (1888-1935). A motorcycle accident in an English country lane brought to a dramatic close one of the most remarkable and romantic careers of the World War period. "Lawrence of Arabia" had become famous the world over because of his amazing exploits as leader of the Arab revolt against the Turks (1916-18); and his dislike of publicity, which led him afterwards to change his name twice and hide himself in the ranks of the British army, had made him an almost legendary figure.

Lawrence was born Aug. 15, 1888, in North Wales. After a regular school course he enrolled at Oxford, where his unusual personality began to show itself. He never attended classes; he spent his nights roaming around the city; he read continuously, covering probably more than 50,000 books.

At an early age Lawrence became interested in the Middle Ages, and this interest resulted in a journey to the Near East, to study the castles of the Crusaders. He tramped all over Palestine, Syria, and Mesopotamia, becoming acquainted with the Arabs, and thus laid the foundations of his great life work.

When the World War broke out Lawrence was back in England. Eager to take part, he was rejected for active service on account of his small size. He soon found a place in the War Office, however, and did his work so well that he was transferred to the intelligence service in Egypt. Soon afterward he was sent to Arabia, with the rank of colonel, and there he began to take an active part in the "Revolt of the Arabs."

Lawrence arrived at a time when the Arabian forces were scattered, weakened, and discouraged. With tireless energy, he rode all over Arabia, winning the confidence and admiration of the tribes, constantly urging Arab unity. He identified himself completely with the Arabs and their cause; he rode about on the swiftest camels, wearing beautiful white flowing robes and the head-dress of an Arab chieftain; he often went for days at a stretch with little sleep; he endured even greater hardships than the Arabs. Soon Lawrence had organized the Arabs into a fighting unit, and by a series of lightning maneuvers he time and again outwitted the Turks, routing them from strong positions and inflicting heavy losses.

The Arabs will long remember Lawrence—they called him "El-Aurens"—for his train-wrecking. The

Turks controlled a railroad which ran to Medina, where they had a strong army entrenched. Over this railroad food and supplies were regularly sent. Lawrence planted mines—"tulips" he called them—blew up supply trains, and captured the provisions for his Arabs.

As the campaign continued, Lawrence, working closely with Allenby, the British general, and with the Arabian Prince Faisal, moved steadily north. He won battle after battle, until in one last magnificent push his forces completely destroyed the Fourth Turkish Army and captured Damascus.

Lawrence's major task was over. But Arab independence was still close to his heart, and he looked after Arab interests at the Peace Conference. The Middle Eastern Settlement of 1921, in which he took a prominent part, he considered a much more important accomplishment than his victory over the Turks. This work ended, he retired from public life, to write his account of the revolt, 'The Seven Pillars of Wisdom'. An abridged edition was later issued, the famous 'Revolt in the Desert'. All the money that came to him from the sale of the 'Revolt' he gave to set up an education fund for officers' children.



Lawrence of Arabia

Throughout his life he would take nothing by way of reward, neither money nor military decorations, for his part in the Arabian struggle. Later he received an appointment to Oxford, but was soon called to the Colonial Office to advise on Arab affairs. Again he retired, entered the Royal Air Force as a mechanic, transferred to the Tank Corps, and finally returned to the Air Force. To escape unwelcome attention, he legally changed his name, first to Ross, then to Shaw. His most important work during this period was a new translation of Homer's 'Odyssey'.

During his last few months, Lawrence led the secluded life of a scholar; but he was planning a return to public activity when the fatal accident occurred.

LAWRENCE, MASS. This city has long been the nation's chief center for the manufacture of woolen and worsted goods. It is also important in the manufacture of cotton goods, dyeing and finishing textiles, and making fine paper. Textile machinery, automobile wheels, shoes, foundry products, and chemicals are other products.

When the movement of textile industries to the South in the 1920's caused a decline in this long-established business, Lawrence began a campaign which brought it many new industries, especially manufactures of hard rubber and electrical and radio parts.

Lawrence lies on the Merrimack River 30 miles from the ocean, and 26 miles northwest of Boston.

The water power of the Merrimack, derived from a great dam begun in 1845, was the reason for the development of industry at this point. The town was incorporated in 1847 and named in honor of Abbott Lawrence, a member of a famous family of Massachusetts merchants and manufacturers, and a director of the company which built the dam. A structure of heavy granite, 900 feet long and 30 feet high thrown across the rapids, this dam now furnishes about 15,000 horse-power.

Lawrence is the center of a district known as Greater Lawrence, including the towns of Andover, North Andover, and Methuen in Massachusetts, and Salem in New Hampshire. Many of those employed in the manufacturing establishments of Lawrence live in these near-by towns. Population of Lawrence (1940 census), 84,323.

LEAD. Among the heavy metals lead is one of the most useful. Lead has done more to civilize man than gold or silver or jewels, for type used in printing is made of lead alloyed with tin and antimony.

Lead is indispensable in industry. That important but destructive agent, sulphuric acid, is made in lead chambers, on which the acid forms a protective coat of lead sulphate, soluble only in concentrated acid. Lead blocks the passage of radon, the radium emanation, and of the X-rays, which are destructive when not controlled; so shields of lead are used to protect operators working with these forces.

Many and Varied Uses of Lead

Lead helps the scientists to study the structure of the blood cells and to analyze the gases of the sun, for part of the refractive glass of microscopes and telescopes is lead. We speak of "leadens skies," yet the sparkle of optical glass and the brilliancy of cut glass are both due to lead. We can take better pictures, and read by a more brilliant light because of the lead in camera lenses and electric light bulbs.

Lead has been used for water pipes since the earliest times, and is still sometimes used in plumbing, though iron is more common. The Romans, the first plumbers, called lead "plumbum," from which comes its chemical symbol Pb. A section of lead pipe dug up in Rome bore an inscription showing that it had been made about 70 A.D. It had lain in the ground for more than 1,800 years and was still in good condition.

Basic lead carbonate, white lead, helps make the best paints; red lead, or *minium*, is used to prevent rusting of iron structures; litharge or lead monoxide is the compound used in making flint glass and glazed pottery. Lead sheaths cover electric cables, lines chemical tanks, and makes plates for storage batteries, and is largely used in building. Mattresses of lead are used as shock absorbers in the foundations of skyscrapers. Lead, alloyed with tin, antimony, and copper, makes one kind of babbitt, an anti-friction metal used in machine bearings. The useful and ornamental pewter is usually an alloy of lead and tin, sometimes with other metals (see Alloys; Storage Battery). Lead compounds are used to hasten the

vulcanization of rubber. With a little arsenic, tin, or antimony, lead makes shot and shrapnel bullets. Shot is made by dropping molten lead from a height into cold water, or by running the metal through small holes into molds. Solder, so necessary in modern industry, is an alloy of lead and tin in varying amounts. An anti-knock motor fuel contains tetraethyl lead. By raising the temperature and pressure at which gasoline explodes, it keeps hot carbon from firing the more volatile portions prematurely.

The United States produces more than one-third and consumes about one-half of the world output. Missouri, Utah, Idaho, Oklahoma, Colorado, Kansas, and Montana are important lead-producing states, but the ores are found in several other states. Mexico, Australia, Spain, Canada, Germany, India, and Belgium are the other chief producing countries. Lead ores often contain silver.

How Lead is Mined and Purified

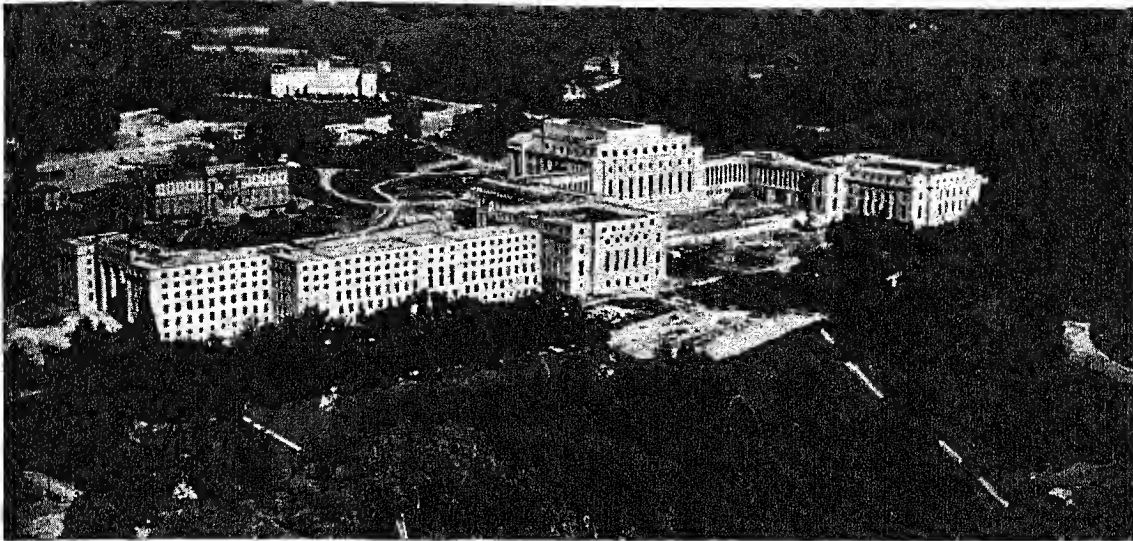
Lead is mined chiefly in the form of galena, lead sulphide, and is obtained mainly from mines worked through shafts and tunnels. The ore is loosened by drilling holes in it, and exploding dynamite in the holes. Small cars haul the broken rock to the surface, where it is put through crushers which separate the lead from a large part of the waste rock. It is mixed in a blast furnace with iron ore, limestone, and coke, and brought to a heat sufficient to melt the mass to liquid form. The sulphur is driven from the lead sulphide by the heat and the action of the iron oxide; and the heavy molten lead settles to the bottom and is drawn off. The slag, which floats on the molten metal, is removed through another opening. The metal is run into molds to form "pig" lead. Galena, Ill., and Galena, Kan., were named from the large deposits of galena ore in the vicinity.

All lead compounds are poisonous, and the poisons are "cumulative"; that is, they accumulate in the body, gradually producing more serious conditions, from colic to nerve paralysis, blindness, convulsions, insanity, or even death. There is little danger from lead plumbing if the water is "hard"; such water forms a closely adhering coat of salts on the pipe which prevents further action. "Soft" water may dissolve some lead and should not be piped in lead.

Lead was used in very ancient times. It is mentioned frequently in the Old Testament. As far back as 2000 B.C. it was used to purify gold and silver, and was mined in Greece (see Greece; Silver). For centuries Spain was the greatest producer, until the United States jumped to the front late in the 19th century. More recently Mexico and Australia have passed Spain in amount of production.

It is believed that certain forms of lead are the end products in the breaking down of uranium through the radium or other series. Lead found in uranium ores has an atomic weight of 206, while ordinary lead has an atomic weight of 207.2, and is believed to be a mixture of three isotopes, with weights of 206, 207, and 208 (see Chemistry). All forms are chemically identical.

The WORLD Organized for International COÖPERATION



The Palace of the League of Nations, at Geneva, Switzerland

LEAGUE OF NATIONS. Long before the League of Nations was established in 1920 by the treaties following the first World War, efforts had been made to settle international differences by round-table discussions. Their frequent success tended to confirm the belief of most enlightened men that nations can settle their disputes and grievances without war; that the interests of individual nations can be harmonized with the interests of others, if only there are the will and desire to reach an agreement. (*See Arbitration; Peace Movement.*)

Furthermore, cooperation among nations had been growing rapidly with the development of new services—telegraph, telephone, and radio; swift ships, railroads, and airplanes. In the half-century before the first World War, international agreements had been made on trade, naturalization, shipping, standard time, weights and measures, postal service, copyright, submarine cables, harbor regulations, and many other matters of international concern. Between 1864 and 1914 more than 225 such agreements were made.

The Permanent Court of Arbitration, established at The Hague by the conferences of 1899 and 1907, was perhaps the most significant attempt to create a forum where justice in the varied fields of international relations could be determined; where even threats of war could be changed to agreements for the common good. (*See Hague Peace Conferences.*)

The League of Nations was first suggested in the "Fourteen Points" presented Jan. 8, 1918, by Woodrow Wilson, then president of the United States, as a basis for armistice negotiations, and they were later adopted by the Allies and by Germany. (*See World War of 1914-1918.*) The final paragraph in this plan stated: "A general association of nations must be formed under specific covenants, for the purpose of

affording mutual guarantees of political independence and territorial integrity to great and small states alike."

Shortly thereafter, many persons gave suggestions for the organization of the League, notably Lord Robert Cecil of England and Gen. Jan C. Smuts of British South Africa. After the peace negotiations opened, the work was continued by a commission headed by President Wilson. As a result of these efforts, a working plan, called "The Covenant of the League of Nations," was drawn up, revised, and signed, June 28, 1919. It became Section I of the Treaty of Versailles, Jan. 10, 1920.

Purpose of the League

The general purpose of the League is set forth in the Covenant's preamble:

... to promote international cooperation and to achieve international peace and security by the acceptance of obligations not to resort to war, by the prescription of open, just, and honourable relations between nations, by the firm establishment of the understandings of international law as the actual rule of conduct among governments, and by the maintenance of justice and a scrupulous respect for all treaty obligations in the dealings of organized peoples with one another.

The organization, powers, and detailed purposes of the League are stated in 26 articles. Its principal specific aims are to promote arbitration for the settlement of all disputes between nations; to hasten progressive reduction of armaments, with the ultimate aim of complete disarmament; to study and bring about the removal of the causes of war; and to promote world interests in all fields of human endeavor.

The League consists of three units: the Secretariat, the Assembly, and the Council. The Secretariat consists of the secretary-general, appointed by the Council and approved by a majority of the Assembly, and about 500 men and women of all nationalities, who

keep records, prepare data, and carry on any other assigned tasks. All treaties are registered at and published by the Secretariat at the League's permanent headquarters in Geneva, Switzerland.

The Council normally consists of 14 members, of whom five are permanent and nine non-permanent. Each of the member countries of the League has only one vote in the Assembly, though it may have three representatives. Both the Council and the Assembly may consider any question affecting international interests. In the event of threat of war, the Council immediately convenes. New states are admitted to the League upon consent of two-thirds of the Assembly; withdrawal requires two years' notice and fulfillment of all obligations.

The Assembly normally meets every September to formulate the League's yearly program and transact other business. It draws up the budget and elects the non-permanent members of the Council. Meetings of both the Assembly and the Council are public.

Members were required to abrogate all previous treaty engagements inconsistent with the Covenant. But agreements tending to promote peace were specifically exempted by Article XXI, which says:

Nothing in this Covenant shall be deemed to affect the validity of international engagements, such as treaties of arbitration or regional understandings like the Monroe Doctrine, for securing the maintenance of peace.

Many permanent committees were set up, such as the Mandates Commission, which was to examine the reports of the mandatory powers governing territories taken from Germany and Turkey.

An early part of the work of the Council, in accordance with Article XIV of the Covenant, was the organization of the Permanent Court of International Justice, or "World Court," in an effort to apply judicial procedure to international questions that involve legal rights; that is, justiciable questions. Its judiciary consists of 15 judges, each elected for a nine-year term by majority vote from a list of nominees submitted by members of the Court of Arbitration, as established by the Hague Peace Conferences. Although the United States is not a member of the League, an American judge, by invitation, sits on the bench of the World Court. It meets at The Hague, and its proceedings are conducted very much like those of the Supreme Court of the United States. The scope of its work is defined in the Covenant:

The Court shall be competent to hear and determine any dispute of an international character which the parties thereto submit to it. The Court may also give an advisory opinion upon any dispute or question referred to it by the Council or by the Assembly.

All the countries which are members of the League have agreed that any international dispute which is likely to lead to armed conflict shall be submitted to the League's procedure. In questions referred to the Council, if the Council makes a unanimous report (the votes of the disputing states not counting), the members of the League are bound not to declare war on the disputant complying with the Council's report. If the Council fails to obtain unanimity, the members

of the League are free "to take such action as they shall consider necessary for the maintenance of right and justice." Article XVI of the Covenant sets forth the "sanctions" or coercive measures which the members agree to use against any member nation which goes to war instead of submitting its disputes to one of the methods of settlement discussed above. The financial and economic boycott is the strongest sanction, but the Council also has the right to recommend the use of military force against the offending nation.

Treaties discussed by the Assembly and later ratified by the states become a part of international law for those states. Furthermore, the League has undertaken to codify the body of existing international law. (See International Law.)

The refusal of the Senate to ratify the Treaty of Versailles kept the United States out of the League. Especially vehement was the attack on Article X of the Covenant, which reads:

The members of the League undertake to respect and preserve as against external aggression the territorial integrity and existing political independence of all members of the League. In case of any such aggression, or in case of any threat or danger of such aggression, the Council shall advise upon the means by which this obligation shall be fulfilled.

The opponents of the League argued that under this article a decree of the Council, of whom all but one would represent foreign countries, might draw the United States into a war to defend some European or Asiatic state. They asserted also that the United States might have to submit to a foreign commission or court such purely domestic questions as immigration. Those in favor of joining the League pointed out that no action could be taken in the League Council except by unanimous consent; that a representative of the United States would have a permanent seat in that body; and that Congress alone still retained the right to declare war.

The League officially came into existence with the ratification of the peace treaty, Jan. 10, 1920, and the first session of the Council was opened in Paris January 16. The first Assembly of the League met in Geneva Nov. 15, 1920, with 41 nations represented. More than 20 nations joined later, but there were also numerous withdrawals. In 1940 the League had an effective membership of 47 nations.

After the World War of 1914-18, the League helped to stabilize finances and to bring relief to war victims. It aided in the suppression of slavery and the illicit narcotics trade, helped to better working conditions, established institutions for the study and treatment of disease, and found havens for political and religious refugees. It successfully arbitrated a number of international disputes which might have resulted in war. In later years, however, it suffered a series of defeats. In defiance of the League, Japan invaded Manchuria and China; Germany absorbed Austria and Czechoslovakia; and Italy annexed Ethiopia and Albania. The League's most crushing failure was its inability to prevent a new World War in September 1939. (See also Europe; World War; Second.)

"PRACTISE Makes PERFECT," and Other Laws of LEARNING

LEARNING. Ability to learn is one of the marvels of life. When we see the boy in the first grade struggling to write and notice his awkwardness, the difficulty in forming letters, the extra movements of feet, legs, arms, body, and head, as he wiggles about, we can hardly believe that ten years later he will be writing easily and smoothly with a minimum of effort, utilizing only the muscles of his hand and arm in achieving a product which in comparison with his first attempts is both skilful and beautiful.

As we observe animals or human beings, whether young or old, responding to a new situation or mastering a new performance, we see that they go through very much the same learning processes. But in the human being the capacity for learning is so marked that we are accustomed to think of it as being peculiarly his.

The first step in learning is to present a new situation which prompts to action or thought. Suppose we build a cage with a door locked by a simple latch, and place a hungry cat within the cage and close the door. Outside the cage where the cat can see it, we put a piece of meat. What happens? Usually when a hungry cat sees and smells a piece of meat, he goes directly

to the food. But now he is checked by the walls of the cage. Here we have the first step in every learning situation. The cat wants the meat, but he cannot get it in the way he has always done. Therefore, confronted with this new situation, he must *learn*.

We watch the cat as he runs up and down the cage, scratches at the bars, and meows frantically in his desire to get out. This random activity is called "trial and error" behavior and is characteristic of the early stages of the learning process. In the course of this trial and error activity, the cat happens to lift the latch, the door opens, and the food is reached. If we wait until the cat is hungry again and put him back into the cage, he will probably get out in a shorter time. Repeat the experiment ten or twenty times and

the cat will unfasten the latch as soon as he is put into the cage. The trial and error behavior of the first attempt has been replaced by a few movements, which are performed quickly and automatically. The cat has learned how to undo the latch. A new

situation plus a strong desire for something is the first requisite of learning, either with animals or humankind.

The boy who watches his older brothers playing tennis faces the same sort of problem. He greatly desires to play the game himself. The first time he plays tennis he will be unable to hit the ball. He will make many unnecessary movements, will tire very easily, and will be awkward and self-conscious. The racket will feel strange. As he continues to practise, the racket will become familiar and unnecessary movements will disappear. He will become less conscious of himself and more conscious of what he wants to do with the ball. After some months or years of practise he will automatically grasp the racket in the proper way, run out on the court without a thought of himself, and hit the ball where he wants without making useless motions. He will be able to play for a considerable period of time without fatigue.

What previously was a difficult, conscious, and rather painful process, has become a simple, automatic, smooth-running activity which is performed with pleasure.

Suppose we chart an actual learning process, such as typewriting, in which it is possible to have an exact record of how fast a pupil learns. He practises on the typewriter for one hour each day. If we count the number of words he writes during each five minutes during the first day and the number he writes during each five minutes during the second day and so on, we shall have a graphic representation of his progress.

On a sheet of paper, let us lay off on a base line the days on which the boy practises and on a vertical line the number of words he writes during each five-

LEARNING BY "TRIAL AND ERROR"



Fig. 1. "Trial and error," as illustrated by the awkward, uncertain movements of this toddler, is the basic process of all our learning. The child learns to walk only by trying out a great variety of movements and gradually discarding all the movements that are useless. "Trial and error" is a necessary part of all learning, but parents and teachers can assist the child tremendously in reducing the number of errors by pointing out the right methods and setting examples of the proper procedure.

minute period. We find that in the first five minutes he wrote 50 words; after 50 hours of practise, he wrote 130 words in five minutes; after 100 hours, 143 words; and after 150 hours, 220 words. We can then plot the boy's learning record to give us a "learning curve" like that shown in Fig. 2. If we plot the cat's record in getting out of the cage, we get a learning curve like that in Fig. 3. When accomplishment is measured by a greater production in a given time, the curve goes up as in Fig. 2; when accomplishment is measured by a decrease in the time taken to do something, the curve goes down as in Fig. 3. Some modern schools use devices in the study of arithmetic which enable the

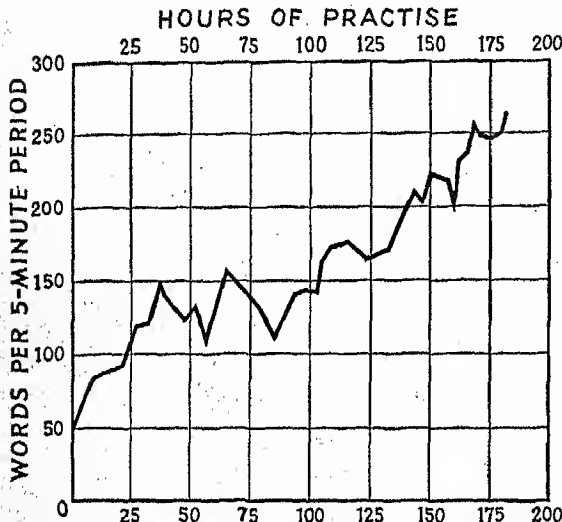


Fig. 2. The wavering line in this chart shows progress in learning typewriting with continued practise. Varying conditions, both mental and physical, cause slight variations but do not affect the main upward trend.

child to chart his own learning curve from day to day and so see whether or not he is progressing.

Figures 2 and 3 are typical curves of learning. They show that more rapid progress is made in early trials and less progress as trials continue. In other words, the more skilful one becomes, the less progress he makes during any given period of practise. It is easy to raise typewriting speed from 5 to 10 words per minute but hard to raise it from 85 to 90 words per minute.

Reaching the Limit of Learning Ability

This is the reason so few people ever reach the peak in any learning process. A Bobby Jones or a Tilden or a Paddock has practised so much under such strong motivation that he has reached a level of skill beyond the attainment of the ordinary individual. This leads us to wonder if continual practise makes a continual rising of the learning curve. Many investigations have been made in an attempt to answer this question. From them we learn that each individual has a physiological limit beyond which he cannot increase his skill. When a golf or tennis champion first starts to play, his skill improves steadily; but before long his skill is much the same year after year. He seems to have reached his physiological limit.

We may, however, take comfort in the fact that very few people practise long enough or hard enough to reach the limit of skill. Most of us, with respect to most of our activities, can still improve a great deal.

Very few learning curves show steady progress from the beginning to the end. They are marked by irregu-

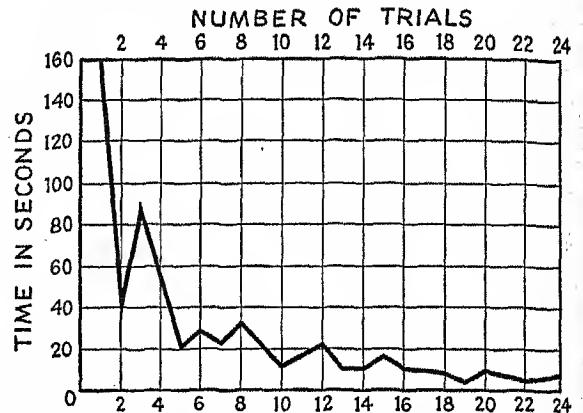


Fig. 3. From this chart we are able to follow the stages by which the cat, in the experiment described on the previous page, became proficient in lifting the latch to escape from the puzzle-box.

larities, many of which psychologists have been able to explain. Some of these irregularities are caused by such accidental conditions as fatigue, lack of interest, and disturbing surroundings, and so have no real significance. Sometimes, however, a person will make

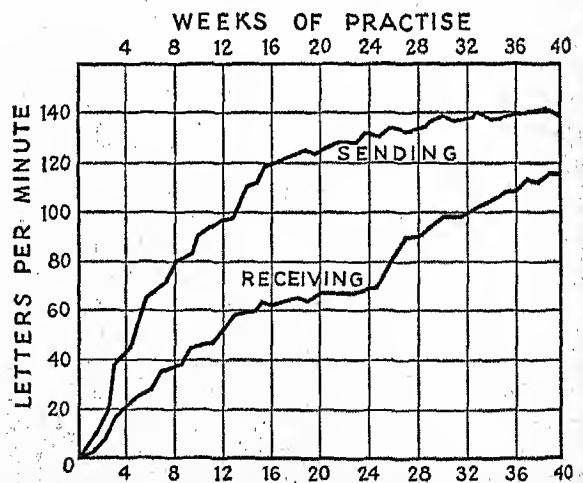


Fig. 4. The student of telegraphy, whose learning curves are reproduced above, found more difficulty in receiving than in sending. Note also the "plateau," a period of no progress, in the lower curve.

steady progress over a period of time, then show no progress at all for a while, but later begin again to improve. This is illustrated in Fig. 4, which shows companion curves for sending and receiving in telegraphy. In sending, progress is uniform, while in receiving there is a period from the 16th to the 24th week in which little or no progress is made. This period of no progress is called a "plateau." There are

two explanations which may account for it. One is that the person, having reached a level of skill on the basis of simple habits, cannot progress until he has combined the simple habits into more complex ones. Let us use an illustration. A boy knows how to run

A LONG WALK TO BREAKFAST

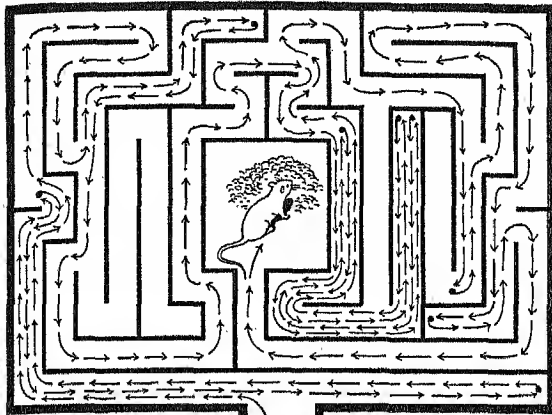


Fig. 5. This maze is used in experiments on the learning ability of rats. Try working it out from entrance to food chamber, and pity the rats who could not see over the partitions as you can.

and he knows how to throw a baseball when he is standing still. He wants to learn to throw a baseball while he is running. For a time he will show no progress in either running or throwing. Then suddenly he "gets the hang of it" and begins to improve again.

The second explanation traces the plateau to the attitude of the individual. When the person is interested, progress is rapid. When interest is lost, he becomes "stale" and discouraged over the difficulty of the problem, and the plateau results.

Experimental evidence in support of this theory comes chiefly from studies on typewriting, in which it was discovered that by giving special motivation to the pupil when he was in the plateau it was possible to eliminate some of them and to produce curves more nearly like those of animals who are urged by a constant desire and show few plateaus in their learning.

Keep At It Constantly and Regularly

It is probable that both theories about these discouraging plateaus are correct. At any rate the practical truth established by such studies is that skilful performance is attained by constant practise, regular effort, and keen interest in the subject. Hence the student should not be worried if he fails to progress for a time. By keeping actively at his learning he will move out of the plateau into a higher level of efficiency.

What happens to a habit or a learned reaction when it is not practised for a time and then is taken up again? After the lapse, the person begins at a poorer level of accomplishment than when he left off, but he has not wholly lost his earlier advantage. For within a much shorter time, he reaches or exceeds the level at which he had previously stopped. This process is called re-learning. Fig. 5 shows the ground plan of a maze used in learning experiments on white rats.

To get at the food in the central compartment the hungry rats had to find their way through an intricate system of passages. On the first day the average time required to do this was 70 seconds. After 8 days of practise the time decreased to 10 seconds. Twenty-eight days elapsed before the next trials. Now only 24 seconds were required at the start, and within 4 days the time was down to 9 seconds. This is graphically shown in Fig. 6.

It is thought by many educators that the purpose of education is not so much to give the pupil a complete mastery of every subject he studies, as it is to build up the basic habits which will later enable him to re-learn with ease the material he wishes to use. A man may almost completely forget geometry after studying it in school. But if, years later, he takes it up again, he will re-learn it in from one-fifth to one-tenth of the time originally required.

The Laws That Govern Learning

A number of laws or principles governing the learning process have been discovered. Of these, the most important are the law of frequency, the law of effect, and the law of the distribution of effort.

The law of frequency states that learning takes place through repetition of the particular act or skill to be learned. "Try again" and "practise makes perfect" are popular versions of this principle. The skilled writer or artist has practised his art literally thousands of times.

The second principle of learning, called the law of effect, states that learning is more rapid when the

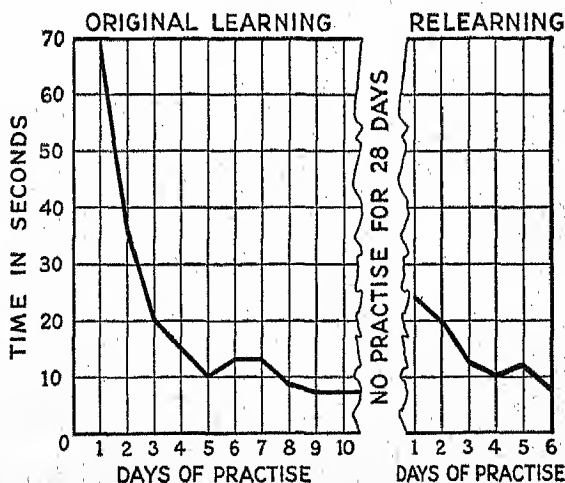


Fig. 6. These curves show the average time it took 33 rats to solve the maze, and regain their skill after a period of no practise. Even for rats, re-learning is much easier than learning. This principle has many important applications in modern educational practise.

results are satisfactory to the learner and less rapid when pain, annoyance, and dissatisfaction follow. A learning situation is ordinarily so arranged that the person sees or knows the results of each trial. If, for instance, a golf green had a heavy curtain placed across it so that the person learning to putt could not see whether or not the ball went into the cup, he would

never achieve skill in putting. When he sees his successful putts, he is encouraged, and his rate of progress is likely to increase. When he fails, he is disappointed. Successful educators, coaches, and even animal trainers make use of this principle. When the horse that is being trained performs his trick successfully, he is given a lump of sugar. When he fails, disapproval is shown. Likewise, the teacher returns the paper to the child with mistakes clearly marked.

The third principle, the law of distribution of effort, demonstrates that too long or too concentrated practice at one particular time is less effective than the same amount of practice broken into shorter periods. In memorizing a poem, a person may practice continuously for five hours or he may practice one hour a day for five days. His progress, under the latter plan, would be far more satisfactory.

The American educational system recognizes the value of distributed practice. It would be possible, for instance, to spend the first three months of the school year studying geography, the next three on arithmetic, and the third three on reading. Such a method would be far less effective than combining the study of all these subjects throughout the nine-month period.

On the other hand, since a certain amount of time is required to "settle down" or create the atmosphere of a subject, study periods should not be too short. For the same reason, they should not be too far apart, otherwise much of the time must be spent in re-learning. The boy who practices tennis strokes every other day gains far more ground, in a given hour of practice, than the boy who lets four or five weeks elapse between trials. The latter finds that he has lost much of his new skill through disuse.

Transference and Interference

One of the most interesting questions in learning, is whether or not training transfers from one activity to another. When transfer takes place it is called transfer of training. When learning of one activity interferes with learning another it is called interference. There is some difference of opinion as to the amount of transfer that takes place.

In education, a new view of this problem has been gained in recent years. Formerly it was believed that wide transference was possible. Experiments have modified this point of view. It is now believed that the value of transfer from one field to another is in direct proportion to the number of identical elements involved in the two. Skill in running, learned in baseball, transfers easily to football. But certain other skills, such as catching a baseball, is of little use in football because the method of catching is different.

Transfer of training seems to be easier when one of the skills is completely learned before another is undertaken. Learning similar skills at the same time causes interference. If one learns thoroughly how to bat a ball and then takes up golf, the transfer effects from baseball to golf are likely to be stronger than the interference effects. But if one tries to learn both games at the same time, each will suffer because the

effects of one will interfere with those of the other. If a person should learn French and golf at the same time, there would be no interference, since the two are totally dissimilar.

The discovery through experiment that skill is not widely transferable from one field to another has made education more practical. Thus young people are trained directly in the schools for certain vocations instead of depending upon general knowledge and studious habits to equip them for later life (see Vocational Guidance).

Various factors affect the course of learning. Many studies have been made of the relationship between certain teaching methods and the results obtained. It has been determined that too much criticism, too many caustic comments, too many attempts to point out mistakes, in the early stages of learning, are more likely to cause the pupil to lose interest through discouragement than to help him. If he has already acquired some skill, criticism will help him to improve.

We Learn Best From Mistakes

Despite all the efforts of educators, it seems necessary for the beginner to blunder through the early stages of learning. The best experiments along this line have been conducted with animals. Shown how to solve a problem, the animal shows little or no more progress than when it follows the natural method of trial and error. The same principle applies to human beings, for they learn through failure as well as through success. This trial and error method is at the root of the whole learning process. If mistakes and errors, which are inevitable for any beginner in any line, are regarded as incidents in the natural process of learning and not as signals for discouragement, mastery of any field will lose much of its difficulty.

In general it may be said that learning is a matter of modification or change in a person's own nervous system, produced by the activity of the person himself (see Study). However much may be taught, learning in the last analysis is a matter of what we do with what we know. Effective teaching, coaching, or training does not merely consist in giving information, but in aiding the pupil to act or think for himself.

As we grow older and continue the process of adjustment to life, we often need to "unlearn" bad habits of thought and action and to replace them with new ones. This is a special and difficult process (see Habit). It is best accomplished by abandoning once and for all the wrong habit or train of thought and vigorously substituting a new one. If a golfer discovers that his swing is wrong, he should not "taper off" from the old way but should begin to practice a correct stroke at once. This is true of mental processes. Since no system of education is perfect, just as no individual life is perfect, "unlearning" is often necessary. It should not be viewed with discouragement; it is a necessary part of the process of learning. Learning does not stop with school days, but is throughout life our most vital and fascinating activity. (See Memory.)

HOW HIDES *and* SKINS BECOME LEATHER



LEATHER. Thousands of years ago men learned that the hides of animals could be saved from decay and made tough and pliable by smoking them, or soaking them in oil, or treating them with solutions of various astringent barks.

At first the whole hide, fur and all, was prepared for wear as a garment; but it was soon learned that by removing the hair the rest of the hide could be made useful for many other purposes. Among ancient nations leather-dressing was one of the most important occupations, and a special quarter in many cities was set apart for the tanners—partly, no doubt, because of the disagreeable odor that accompanies the process.

The hides and skins of domestic animals are the great source of leather supply. The skins of the larger animals, such as cattle and horses, are called "hides"; those of the smaller animals, such as sheep, goats, hogs, and dogs, are called "skins." Hides of small cattle are known as "kip skins." The deer, kangaroo, wallaby, buffalo, ostrich, snake, lizard, alligator, hair seal, walrus, and shark also furnish leather. Reptile skins from the tropics, chiefly those of the boa, python, and water snakes, are made into women's shoes, purses, and similar articles. The United States imports more than half the skins it tans, and over 80 per cent of all types of leather goes into boots and shoes.

Before hides become leather they go through many processes, which are much the same as those employed in ancient Egypt. First the skin is removed from the animals, as nearly whole and unblemished as possible. With modern tools this is done skilfully and quickly; sometimes air is forced under the skin with

THE skins of some 140,000,000 animals are converted into leather every year in the factories of the United States, and from that leather articles worth nearly two billion dollars are manufactured. Think of the immense variety of uses to which leather is put—shoes, gloves, harness, belting, upholstery, bags, suitcases, book-bindings, coats, aprons, and a host of others—and you will realize why it is one of the three most important contributions from the animal world, food and wool being the other two.

a bellows to make removal easy. "Packer" hides are the skilfully skinned and preserved hides which come from the great meat-packing establishments; the less scientifically handled hides sold by farmers and local butchers are classed

as "country" hides and bring a lower price. If the hides go at once into the tanning process they are left untreated or "green." If there is any delay they must be dried, or "green salted," that is, have salt rubbed into the flesh side to prevent decomposition.

At the tannery the skins and hides are trimmed to remove flesh and useless parts, and put into "soaks"—large tanks of water. Here they are left for from two to four days to be plumpened, softened, and cleansed. The "fleshing" machine next removes all fat and tissue. The hair is loosened by a limewater bath and is scraped off by another machine.

After thorough washing and trimming the hides are ready for tanning. The purpose of tanning is to stop decomposition, to give the hides greater strength, toughness, and pliability, and to make them impervious to water. There is a choice of processes, upon which will depend the grade and special quality of the finished leather. The chief processes are the tanbark treatment, treatment with different oils or tallow, and the chrome or chemical process. When it is desired to tan skins without removing the fur or hair for use as furs or floor mats, they are "tawed" or dry-tanned by packing in moist salt and powdered alum.

For the heavier leathers and some of the lighter kinds, the tanbark process is in most general use. Barks of many kinds of trees and other vegetable substances containing tannin are used, and the manner

of their use and the choice of barks largely determine the kind and quality of the leather. Most heavy leathers, such as sole and belting leather, upholstery, harness, bag, and strap leathers, are tanned with hemlock and oak. In Australia the mimosa or wattle-barks are much used. Tannin is also found in the bark and leaves of most forest trees, but only the

The liquid used is a solution of chromium salts, obtained from chrome iron ore, which comes chiefly from Rhodesia, India, and New Caledonia.

Oil tanning is used for making soft glove leathers such as chamois, buckskin, and piano leather. The process, called *chamoising* ("shammying"), consists of working oil into the skins, to make them spongy and

HOW THE HAIR IS REMOVED FROM THE HIDES



One great advantage in visiting a tannery "by picture," as we are doing here, is that you escape the smells; for the smell of a tannery is something awful! This smell comes from the wet hides. When the hides are brought into the tannery they are soaked in water to get the salt and dirt out of them. Then they are put into a succession of vats each containing a stronger chemical solution than the one before. This loosens the hair so that most of it is easily removed by the "dehairing" machine. The hides are then turned over to the "beamsters" who lay them over beams such as you see on the right and scrape off the remaining hair with knives.

chestnut provides enough to rank with the oak and hemlock in the United States. Other important tanning materials are *quebracho*, a flourishing tree of South America; *myrobalans*, the fruit of an Indian tree; *divi-divi*, the dried seed-pods of a South American tree; *gall-nuts*, abnormal growths found on oaks, caused by a gall wasp which lays eggs in the twigs; *gambier*, the product of a shrub cultivated in Singapore and the Malay Archipelago; *mangrove*, from the mangrove trees of Borneo; *valonia*, the acorn cup of the Turkish and Greek oak; and *sumac*, the ground leaves of a plant grown in Mediterranean regions.

The skins are suspended in vats containing tanning solutions made of these ingredients, singly or in combination, and are removed from one vat to another, each succeeding vat containing a stronger solution than the one before. They are then dried by artificial heat, oiled, and ironed by large rollers.

Bark or vegetable tanning requires from 90 to 100 days, while the process of chrome or chemical tanning takes less than a third of that time. This process was invented by an American in 1884, and is now the most general mode of dressing light leathers. It is also used for heavy leathers where great strength is needed.

soft. Many of the soft leathers formerly treated in this way are now chrome-tanned.

The finishing processes are varied according to the use for which the leather is intended. The leather as it dries after tanning is stiff and rough. Rubbing oil into the leather to make it soft and pliable is called "currying." Sometimes the currying and finishing is done as a separate industry, the currier buying the rough leather from the tanner. Dull leather, such as is used in the cheaper grades of shoes, may be simply oiled and worked to make it pliable. Harness leather and sole leather is put in great presses to make it hard and durable. If a luster is desired a dressing is applied to the grain side of the leather and then it is run through pressure rollers which polish the surface; if a dull polish is desired a revolving brush is passed over the surface. Grain leather may also be given a pattern, as is done in box calf or imitation alligator skins.

The coloring of leather is an art in itself, requiring great care to bring about a uniform result. Different skins going through the same color bath will be of different shades, and various portions of the same skin may take the color unevenly so that the leather may appear spotted.

The modern factory aims to eliminate all waste. The small pieces of leather chipped off in trimming the hides for market are combined with some of the substances used in the course of the tanning, and made into a pulp that will harden into any required shape or into boards to be cut into shoe heels and inner soles. The tissues and scraps cut from the untanned hides are used for glue, and the hair is sold for making cheap blankets and cloth, or used in the making of plaster.

Leathers are distinguished by many names according to their material and treatment. The most numerous and useful are made of cowhide and calfskin, which furnish more than 70 per cent of the total leather supply of the United States. *Box calf* is calf leather stamped with irregular lines forming rough rectangles. *Wax calf* is heavy calfskin with a wax finish. *Ooze* or *suède* calfskin (sometimes kid) is finished by "buffing" or grinding the face on an emery wheel. *Dull calf* or *gun-metal* has a smooth unglazed finish.

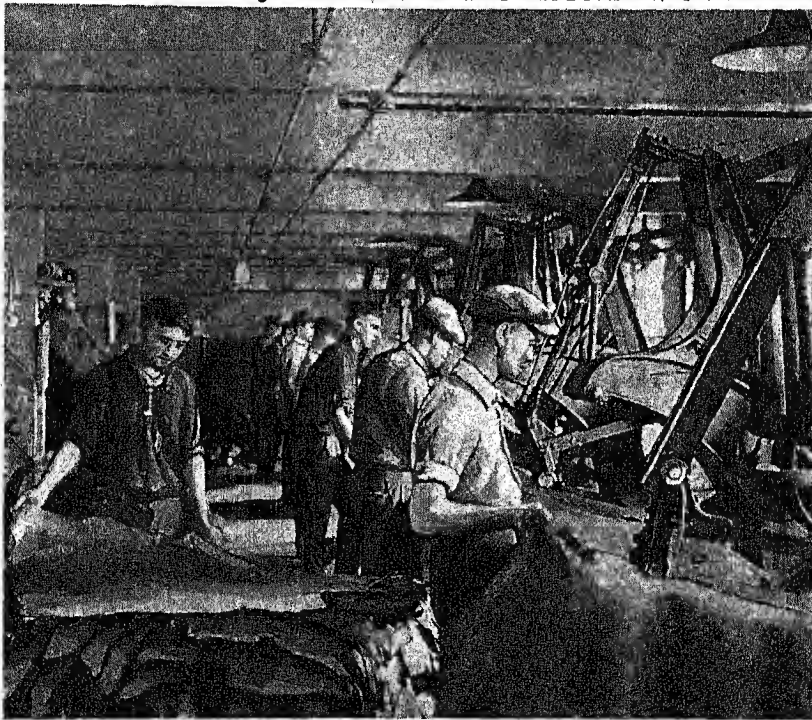
About 25 per cent of the leather supply is furnished by the skins of sheep and goats, which are used chiefly for shoe uppers and gloves. Kid or goatskin (all imported) is the usual material for women's and children's shoes. *Glazed kid* is the most common form, having a smooth highly polished surface. *Vici kid* is a proprietary name or trademark for a chrome-tanned glazed kid. *Undressed kid* is a skin dressed only on one side, used chiefly for gloves. Heavy plump goatskin, tanned by a combination vegetable and chemical process and having a semi-bright finish, is called *Dongola*. *Morocco* was originally a sumac-tanned goatskin, made in Morocco and stained red; the term is also applied to imitations of morocco, also to any heavy tanned goatskin.

Russia leather was originally a very high-grade calfskin made in Russia and dressed with birch oil, which gives it a peculiar fragrance; it was dyed a deep red. So-called Russia leather is now made throughout Europe and America of heavy skins of various kinds, and finished in tan, brown, or black. Red Russia is now chiefly used for binding fine books, as the leather is watertight and strong and repels insects. *Patent leathers* are made from any firm soft leather, free from grease and with no tendency to

stretch. Successive coats of black varnish are applied, until the surface is covered with a heavy coat of enamel, and the last coat is baked on. *Cordovan* is horsehide, very durable and watertight; the name comes from the Spanish city Cordova, which had an ancient reputation for making fine shoes. Imitations are now made from calf. *Chamois* is properly the dressed skin of the Alpine chamois, but the genuine article is very scarce; most so-called chamois is now oil-tanned sheepskin. *Buckskin*, which originally was tanned deerskin, is now usually suède-finished calfskin or kid. It is a buff or a cream colored leather, almost as soft and pliable as cloth, and is widely used in glove-making.

Because of the increasing demand for leather and its consequent rise in price, various substitutes have been devised, some of which closely resemble leather

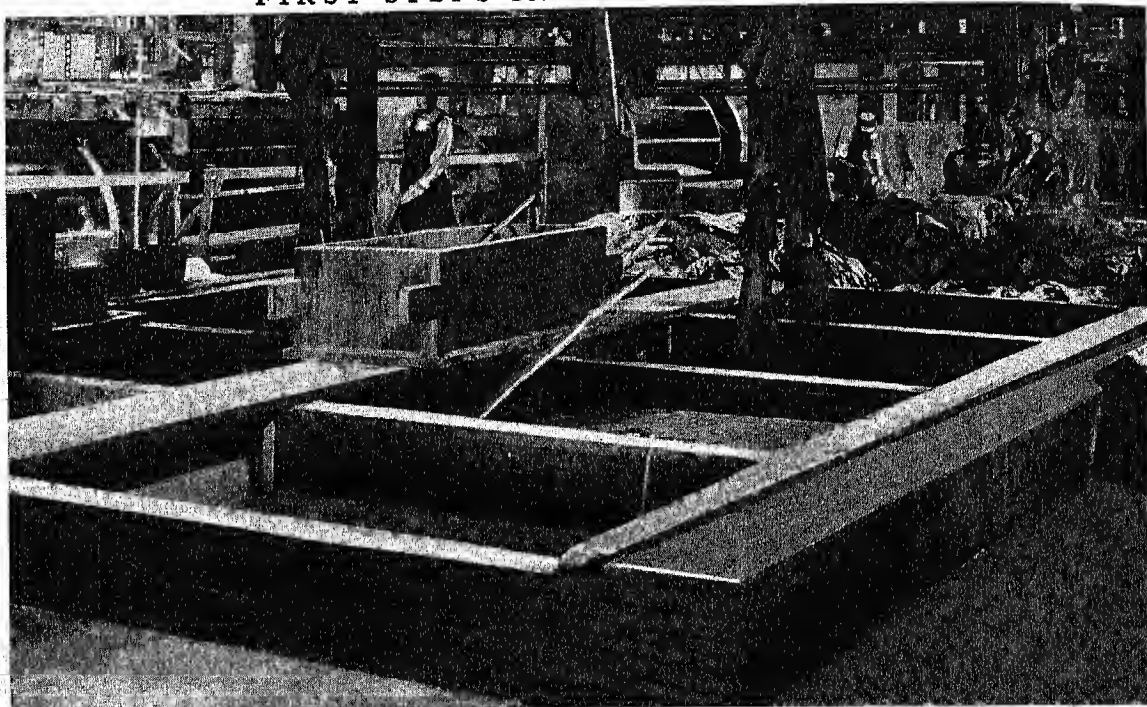
HOW THE "JACKING" MACHINE WORKS



You might well wonder why they do not call them "ironing" machines, for their business is to iron out the leather so it will lie nice and flat under the knives of the splitting machines.

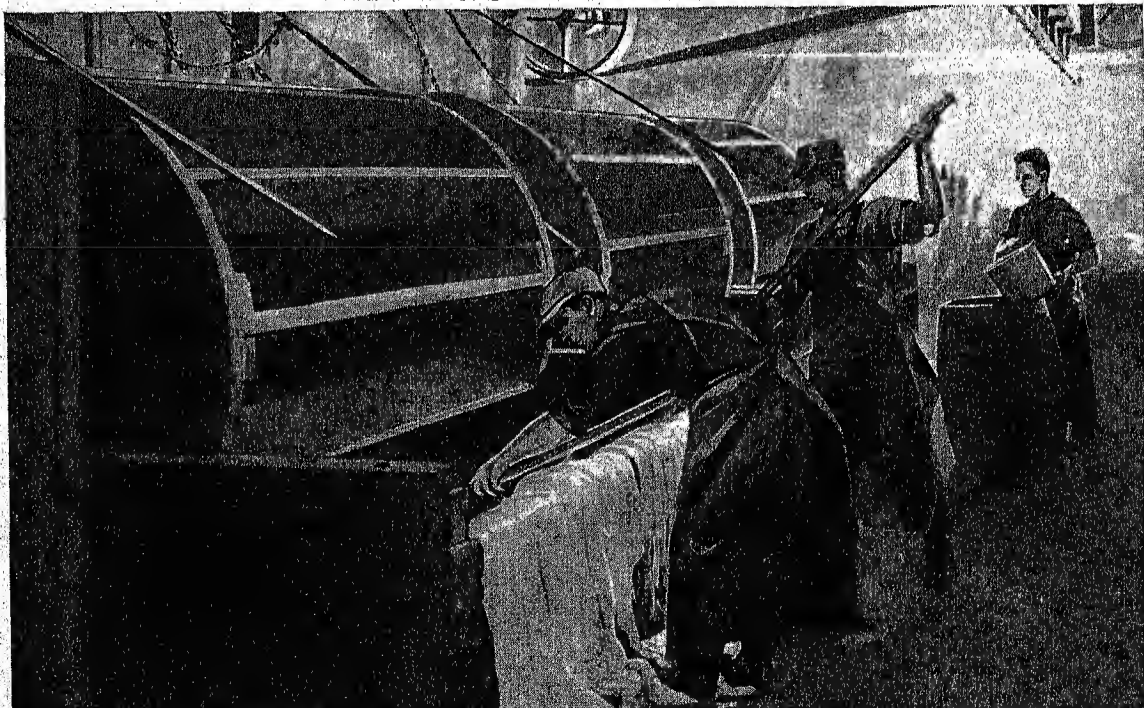
in feeling and appearance. A good artificial leather, or leatherette, is made of strong fabrics coated or ground together with a cellulose compound (see Pyrox-ylin Products). Scrap leather may be included in the mixture, but it may be replaced by paper refuse, old pasteboard, hay, straw, wood pulp, etc. Artificial leather is widely used for upholstering automobiles or furniture, and for bags, suitcases, etc. "Split" leather is made from the weak, fleshy part of the hide, split away before tanning. It is used where great strength is not required, as in book bindings. Splits may be coated with a cotton solution and embossed.

FIRST STEPS IN LEATHER MAKING



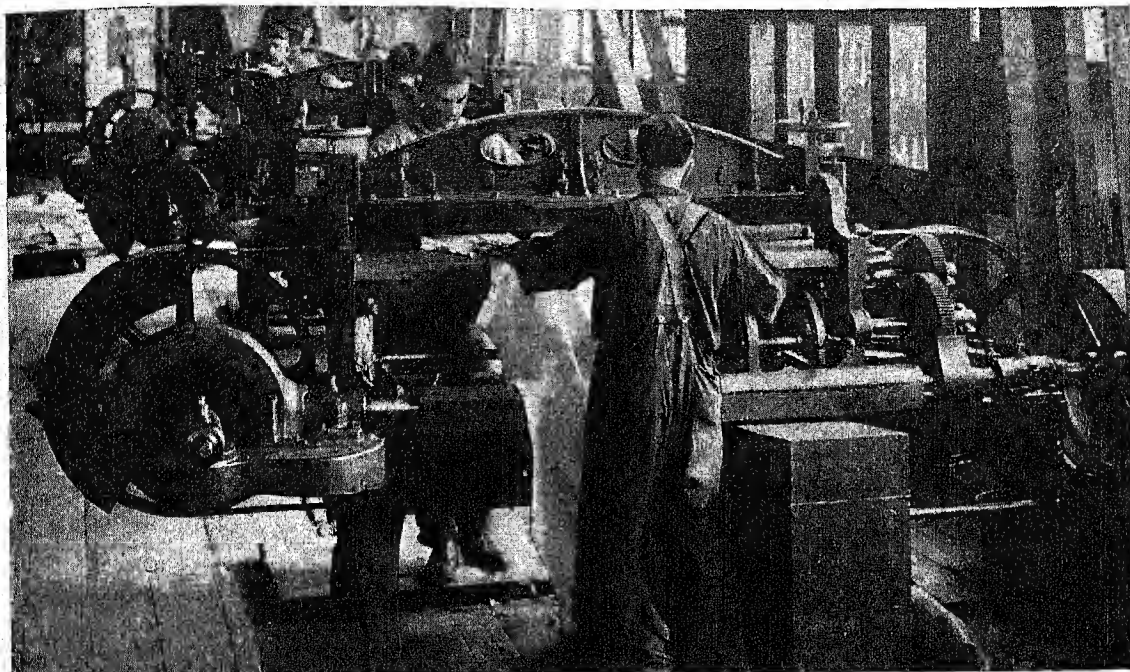
When the "raw" hides reach the factory, the hanging parts such as the ears and tails are trimmed off, and all clinging bits of flesh are carefully removed. Then the hides are put into lime vats, like the one shown here. The lime loosens the hair. The workmen who handle the hides from the lime vats must wear rubber gloves to keep the liquid from eating into their skin.

"PADDLING" THE RAW HIDES



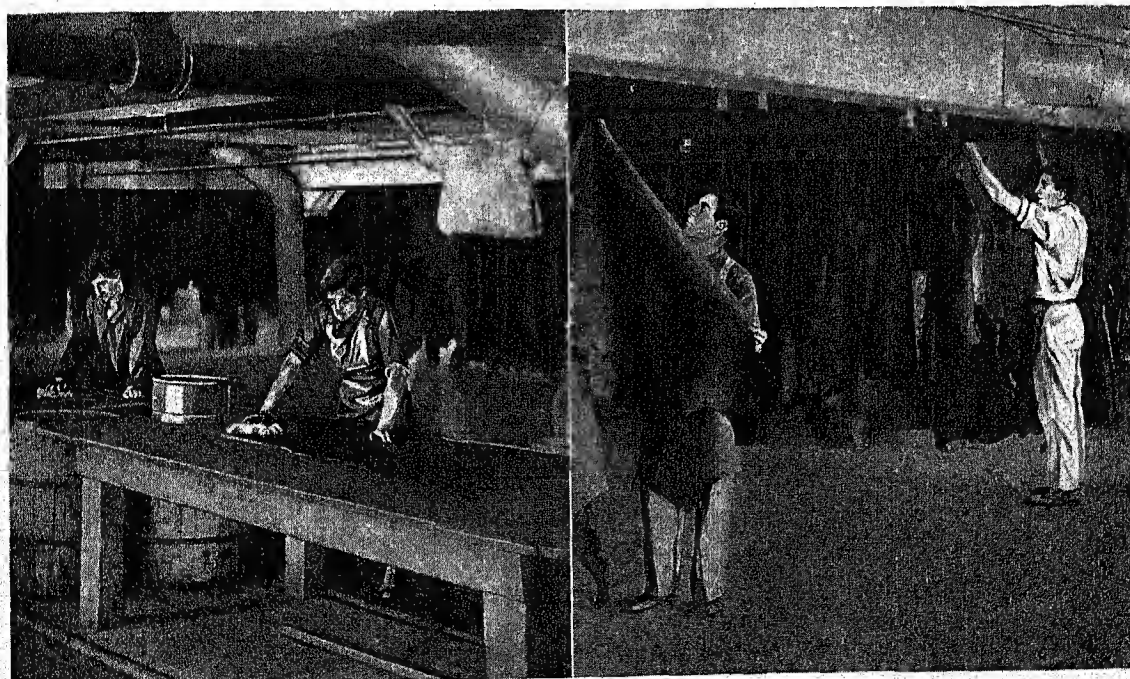
After the skins have soaked in lime for a while, they are put into vats like this to be washed clean. The paddle wheels revolve, carrying the hides around with them and, the water being constantly renewed, the lime is gradually removed. If it were left on the hides, it would not only loosen the hair, but would affect the skin as well.

FEEDING HIDES TO THE SPLITTING MACHINE



Here we see a workman putting a hide into the splitting machine. This machine is delicately adjusted to shave the hide into two sheets. The hair half is called "grain" leather, and the flesh half is called "split" leather. The grain leather has the firm tough fiber that made up the outside of the animal's skin, and is therefore of higher grade than the split.

AT THE END OF THE PROCESS—OILING AND DRYING



After the hides have been tanned, they are colored, seasoned, and oiled. Here we see two workmen applying the oil with soft cloths. The right hand picture shows the men hanging up the hides to dry. Once dry, the finished leather is sorted according to weight. The heaviest and strongest skins are collected and classed as "first grade," and the others graded accordingly. Since leather is sold by the square foot, each hide is measured in a measuring machine and its size marked upon it. Then they are put into big bundles for shipping.

ALL ABOUT LEAVES *and* THEIR USES to PLANTS

*They Serve as Mouths, Stomachs, Pores, and Lungs and in Helping Themselves
They Help Us, for They are the Original Source of Nearly All Our Food,
Even Such Things as Bacon and Eggs*

LEAVES. Most people look upon leaves merely as the brilliant costume of the trees without realizing their immense importance to human as well as to plant life. It may be surprising to learn that by far the largest part of the food you eat is manufactured originally by the leaves of plants, even your breakfast bacon and eggs if you follow them back far enough. Indeed, we shall see that leaves are the mouths, the lungs, the stomachs, the pores, and the "eyes" of the plant, without which the plant could not live and grow.

We can learn all the more important facts about leaves by examining any ordinary leaf from a tree or bush. From the stem a network of veins branches out to all parts of the leaf. Those veins act not only as the fiber skeleton which holds the leaf spread out in shape, but as the "blood-vessels" which connect every portion of the leaf with the deepest rootlet far away underground. In between the veins, the leaf is filled with a spongy mass of green-colored cells, held in place by a thin skin or membrane on the upper and lower surfaces.

Now let us follow the leaf through a day's work as it hangs upon the tree. First, we will find that the upper surface nearly always faces toward the sunlit sky. If a tree is growing close against a high wall, very few leaves will be found on the dark side. That is because the leaf needs sunlight to do its work. There are a few interesting exceptions to this rule, however, such as the compass plant, whose leaves are turned on edge



Trees with thick foliage, like the horse-chestnut shown here, almost always have leaves of the "split" variety—that is, each leaf is split up into several parts so that the sunlight can pass between them and reach the leaves beneath.

pointing north and south, to avoid the too intense heat of the sun in the dry hot regions where it grows (see Compass Plants; Eucalyptus).

As the sunlight strikes through the smooth transparent membrane on the upper surface of the leaf, small quantities of air enter through thousands of tiny "mouths" (stomata), mostly on the under side. A strange process (photosynthesis) now takes place. The green coloring matter (chlorophyll) of the

leaf takes from the air a substance called carbon dioxide, and mixes it up with the water from the distant roots. Then, with the aid of the sunlight,

HOW LEAVES EAT AND BREATHE



This is the epidermis of a leaf highly magnified, showing the eating and breathing pores open. These stomata, as they are called, not only serve as mouths, but as pores through which the leaf sweats and so keeps cool in spite of the heat of the sun.

the leaf manufactures out of this mixture the sugars and starches which are the basis of plant food, and turns out into the air again through those same "mouths" the surplus oxygen. The sugars and starches then pass back through the veins and stem of the leaf, and unite with other chemicals in the sap to nourish the plant and build up the hard woody material (cellulose) of the stem and branches (see Cellulose).

But the leaf performs another important function. When they are not drawing in air to help make food, the "mouths" turn into "pores" and perspire away the excess water sent up from the roots. This helps to keep the leaf cool and healthy, in spite of the burning rays of the sun.

In a sense the leaf "sees" the light, for the leaves of a plant growing in a cellar will keep turning toward the windows, no matter how often the position of the plant is changed. There are, in fact, what corre-

spond to eyes on the upper surface of a leaf—that is, tiny cells covered with curved transparent membranes like the lenses in a telescope or camera. It has been shown that if a film of water covers the upper surface of certain leaves, so as to destroy the focusing effect of these tiny leaf-lenses, they appear to be no longer able to determine the direction of the light. The leaves of some plants are sensitive to touch as well as light (see Sensitive Plants).

Plants show a wide range of leaf shapes, each suited to particular needs. But they may all be divided into three classes according to the arrangement of the main ribs of their skeleton: (1) those with several main ribs branching out finger-like from the stem, called "palmate" (from the Latin meaning "palm of the hand"); (2) those with a single large middle rib from which smaller ribs branch out feather-like on each side, called "pinnate" (from the Latin meaning "feather"); and (3) those in which the ribs do not form a branching network at all, but run straight from the stem to the tip, called "parallel veined."

The great differences in the outlines or outer shapes of leaves are mainly due to the extent to which one or the other of these three types of skeleton frame-works are filled in with the green cell-tissue. For instance, the round nasturtium leaf, the slightly indented leaf of the scarlet geranium, the ivy leaf with its sharp lobes, and the leaf of the horse-chestnut, which is split into sections clear down to the stem—these are all of the palmate type, with different quantities of flesh on their bones, so to speak. Similarly the beech leaf, the oak leaf and even the locust leaf, which consists of groups of pairs of

small leaflets arranged around the main stalk, are all examples of the pinnate type. Lilies, tulips, and almost all grasses illustrate the third or parallel-veined type of leaves.

Leaves are arranged in such a way as to get the greatest possible amount of light; they may be in pairs (opposite), or in spirals or zigzags about the branch (alternate), but no leaf will ever closely overlap another.

The normal form of the leaf is broad and thin, but there are many modified leaves that you would not be likely to think of as leaves at all—the needles of the pine tree, the long ribbon streamers of giant seaweeds, the fronds of ferns, the tiny

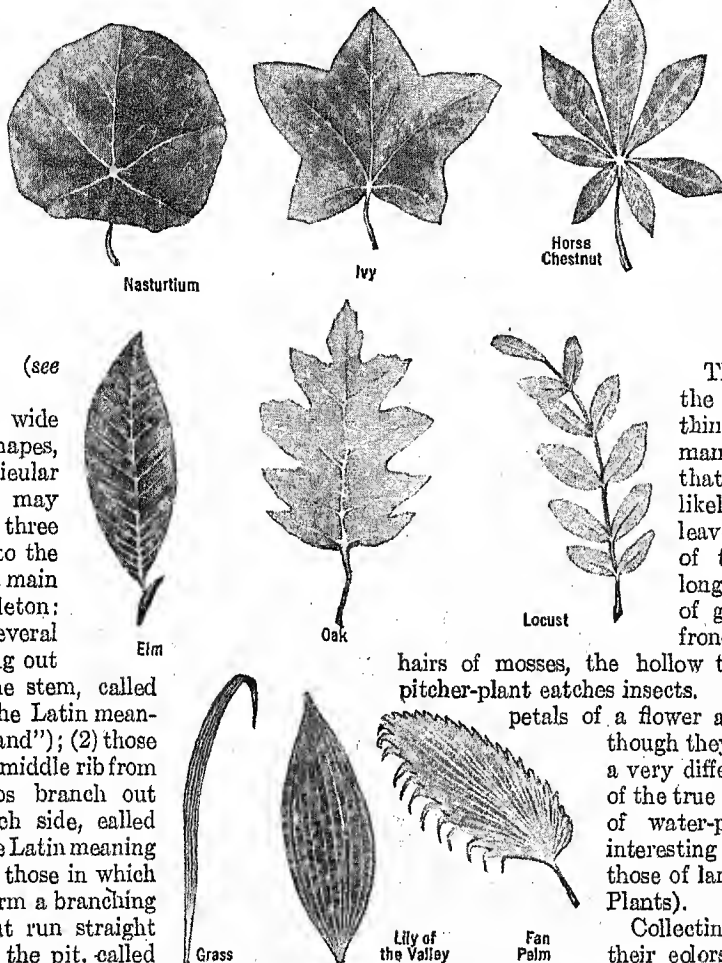
hairs of mosses, the hollow traps in which the pitcher-plant catches insects. Even the sepals and petals of a flower are modified leaves,

though they have come to play a very different role from that of the true leaves. The leaves of water-plants show many interesting differences from those of land plants (see Water Plants).

Collecting leaves, either for their colors in the fall, or for their different forms, is a fascinating pastime. They can be easily pressed out flat, labeled in ink, right on the leaf itself, and mounted in a blank book. Just try beginning a collection this summer, and see how soon you will know every tree and shrub in your part of the country.

In the autumn the leaves of deciduous trees deck themselves in gorgeous crimsons, purples, browns, and golds. These remarkable displays of color are the result of life changes taking place in the trees themselves. The tree is thrifty and a good manager, and when it feels the approach of autumn,

HOW NATURE PLAYS WITH LEAVES



Leaves are classified according to the pattern of their "veins." Each of the rows here contains leaves of the same class, although the outlines differ radically. Those in the top row, for instance, are characterized by veins branching from a common center. They are called "palmate" from the resemblance of this pattern to the palm of the hand with its branching fingers. The Nasturtium leaf, as you see, has an almost unbroken round outline, the Ivy is cut into star-shape, while the Horse-Chestnut is cleft between the veins all the way down to the stem. The leaves in the middle row are of the "pinnate" variety so called because of the resemblance of their vein pattern to a feather (Latin, *penna*). Notice that the veins in each of them branch out from a middle rib. In the case of the Locust the cleft between the ribs is carried to the extent of making each leaflet look like a separate leaf. At the bottom we have leaves of the "parallel-veined" type, in which each vein starting at the base, runs to the tip without network or branching.

it puts on a thicker coat of bark over its twigs and prepares for the loss of its leaves.

Scientists are still in doubt about exactly what happens, but this much is certain: Normally the leaf is filled with chlorophyll, the green coloring matter which "makes food out of air" (see Plant Life). When the tree's life slows down, the leaves contain less chlorophyll and the other coloring pigments get a chance to show their colors. Among them are the derivatives of *carotin*, the substance which colors carrots; and the dyestuffs called *anthocyanins* (reds and purples) and *flavones* (yellow) which always are present in a leaf. These substances give leaves their gorgeous autumn colors.

Meanwhile, glucosides, which start as simple sugars (see Sugar), circulate in the sap and bind to themselves compounds which otherwise might poison the tree. To prevent the loss of sap when the leaf falls, a corky layer grows between the twig and the leaf stem. (See also Tree.)

Most leaves consist of two distinct parts: the *petiole* or stalk attached to the stem, and the thin expanded portion called the *blade*. Sometimes there is no petiole and the blade is attached directly to the stem. Many leaves grow from between a pair of small appendages called *stipules* attached either to the base of the petiole or to the stem. Some stipules remain attached during the life of the leaf, as in the apple. In the grasses the lower part of the leaf folds around the stem for some distance and is called the *sheath*.

If the leaf consists of a single blade it is called *simple*. If it is divided into two or more distinct parts (called *leaflets*) the leaf is *compound*. The green pulpy substance of a leaf is called the *parenchyma*; the outer layer of cells is the *epidermis*; both are examples of plant tissue.

LEE, RICHARD HENRY (1732-1794). On June 7, 1776, Richard Henry Lee moved in Congress the resolution "that these colonies are, and of right ought to be, free and independent states." On this resolu-

tion his fame chiefly rests, though it was by no means his only service during the Revolutionary War.

In the 10 years of agitation preceding the Revolution, Lee opposed the arbitrary measures of the British ministry. To him belongs primarily the credit of suggesting in 1768 committees of correspondence to secure unity of action among the colonists. This suggestion was acted on in 1772, and the committees formed then were the first attempt at concerted action, and paved the way for the Continental congresses of 1774 and 1775, of which he was an influential member.

In 1776, acting upon instructions which he had received, he introduced into Congress the famous resolution quoted above. A short time later he was called home by the illness of his wife, and so did not serve on the committee which drafted the Declaration of Independence. He served as president of the Continental Congress under the Articles of Confederation from 1784 to 1786.

In 1787, Lee was so opposed to the idea of a new Constitution that he declined an appointment to the Constitutional Convention. When the Constitution was submitted to the people for adoption, he and Patrick Henry were its most violent and tireless opponents, because they feared it would deprive the states of their rights and that it might become an instrument of tyranny. Lee's pamphlets opposing its ratification, entitled, 'Letters of the Federal Farmer', had a wider circulation than any of the other pamphlets either for or against the new form of government.

He became reconciled to the Constitution, however, after it was put into operation, and in 1789 accepted the position of one of Virginia's first senators under the new form of government. Ill-health forced him to retire to private life in 1792.

The MILITARY GENIUS AND HERO of the SOUTHERN CONFEDERACY

The Story of a Man Who Gave the Services of His Brilliant Mind to a Lost Cause and Offered Up All Worldly Advantages on the Altar of His Sense of Duty

LEE, GEN. ROBERT E. (1807-1870). "Marse Robert," as the great military leader of the Confederacy was affectionately called by the people of the South, died a few years after the close of the Civil War. He knew the day would come when Blue and Gray would clasp hands above all those graves. Could he have lived until the centenary of his own birth, Jan. 19, 1907, he would have heard his eulogy pronounced by a Massachusetts Adams. He would have seen all parties and a national press united to do honor, not only to his genius as one of America's greatest soldiers, but also to the nobility of his character.

Robert Edward Lee was born at Stratford, Westmoreland County, Va., but the family soon removed to Alexandria on the Potomac near Washington. His father was "Light-Horse Harry" Lee, of Revolutionary fame, and his grandfather was first cousin to Richard Henry Lee, mover of the Declaration of

Independence. Patriotism was a tradition of the family. So it was natural that Robert should be educated for the army. He was graduated from West Point in 1829, the second in rank in his class, without having received a single demerit. He was assigned to the engineering branch of the service.

At 25 he married Mary Custis, great-granddaughter of Martha Washington and heiress of the beautiful estate of Arlington, on the Potomac opposite Washington City. Fortune seemed to have marked him for its own. To birth, wealth, a cultivated mind, courtly manners, a fine physique and handsome face, were added personal happiness and eminence in his profession. As assistant chief engineer of the army in the Mexican War he won distinction; as superintendent of West Point in the 50's he introduced the best methods known in Europe. On the eve of the Civil War he had only the rank of a colonel, but



GENERAL ROBERT E. LEE

General Winfield Scott, head of the national forces, was too old to take the field, and he looked upon Lee as his most probable successor.

In 1852, in entering his own son at West Point, Lee said to him: "Duty is the sublimest word in the language; you cannot do more than your duty; you should never wish to do less." In April 1861, the question of duty confronted Lee himself, when President Lincoln definitely offered him the command of the United States forces.

From the very beginning of the United States government the question of the rival claims of the states and the Union was a matter of debate. The South had generally advocated the principle of state sovereignty. Lee had already written, "I cannot anticipate a greater calamity for the country than the dissolution of the Union." But he was a Southerner, and he felt that his first duty was to Virginia. In the same crisis Admiral Farragut decided for the Federal government. In remembering Lee's decision, it must be remembered that his interests lay with the government; and there is reason to believe that he knew even then that the Union must triumph, so that he consciously led a "lost cause" from the beginning. Beautiful Arlington, his wife's birthplace, his own home for 30 years, and his children's ancestral inheritance, was lost immediately. It lay on the natural line of defense of the capital and became the first camping ground of the Northern army. His fortune was lost when he resigned his commission and offered his services to the South. He was made one of the five full generals in the Confederate service. In the spring of 1862 he was placed in command of the armies operating in defense of Richmond. The masterly strategy which Lee displayed in the "Seven Days' Battles" showed him to be a commander of the highest ability. The same may be said of his movements in opposition to General Pope a few weeks later. Lee's success against McClellan and Pope emboldened him to attempt an invasion of Maryland in the fall of 1862. This campaign was terminated by the indecisive battle of Antietam, fought on the 16th and 17th of September. In December he decisively defeated General Burnside at Fredericksburg and the next May he defeated and drove back General Hooker in the battle of Chancellorsville.

The Last Stand for the Lost Cause

Lee then gathered together all his available forces and again moved northward, his campaign ending with the battle of Gettysburg, which took place on the first three days of July 1863. On the first two days of this battle the advantage seemed to rest with Lee's army, but on the third day he staked the issue in a grand charge, which was completely repulsed, and he was compelled to retreat. He succeeded, however, in recrossing the Potomac, and was again safe in Virginia.

No operations of importance were undertaken by either army during the winter of 1863-64; but early in May 1864 General Grant was called to Washington, and took the field against Lee's army in person.

Grant attempted to turn Lee's right flank by a march through the densely wooded region known as the Wilderness. Here occurred two days' bloody but indecisive fighting, after which Grant again sought to turn Lee's flank by marching to Spottsylvania Court House. At this place on the 12th of May there was another bloody and indecisive engagement. The two commanders continued to maneuver for some weeks without coming to a general engagement and without any result, save that Lee was gradually forced back toward Richmond.

In the spring of 1865 General Lee was compelled to abandon both Petersburg and Richmond. He was still hotly pursued by Grant, and a few days later at Appomattox Court House his entire force surrendered, and the war came to an end. Lee might have prolonged the struggle indefinitely by breaking up his army into guerrilla bands and scattering them among the mountains, but this he refused to do. There are few instances of greater nobility than that with which he accepted defeat, and set himself to helping to make his country once more a union of loyal states.

Although impoverished by the war, and face to face with old age, he refused wealth and places of honor in service abroad to accept the presidency of Washington College, later renamed Washington and Lee University, at Lexington, Va. Its doors had been closed for four years. The building up of this institution was General Lee's part in the work of reconstruction. He died at Lexington on Oct. 12, 1870, and his body rests in a mausoleum in the university chapel, beneath a fine recumbent figure of himself done by Edward V. Valentine, a noted Virginia sculptor.

LEECH. The leeches are blood-suckers which belong to the worm family, and they have soft flat bodies divided into segments. At each end is a rounded sucker, a large one at the tail end, and a smaller one where the mouth is. Most leeches live in the water, where they attach themselves to fishes, turtles, and frogs, and even to persons who go in swimming in ponds and brooks and to cattle which come down to drink. They fasten themselves with their hind sucker, and then with the mouth sucker they suck up the blood through three little holes which they make in the skin with their sharp triangular teeth. Leeches swim well, curving their bodies like eels and moving with the pointed tail end foremost.

A few leeches live on land. These are found chiefly in the damp forests of Asia and are terrible pests.

The stomach of a leech extends throughout almost the entire length of the body and has numerous little sacs along its sides. These greatly increase its capacity, so that the leech can swell out its body with the blood it has sucked almost as if it were made of rubber and one meal may last for several months.

Leeches were formerly used a great deal by physicians for drawing off or "letting" blood from feverish patients, but they are little used today.

Along the body the leech has rows of little sense organs, which look like pimples. These are very sen-

sitive and tell the leech the temperature of the water and the presence of food or enemies. Near the head these sense organs become modified into eyes.

There are two common species of leeches. The *horse leech* is jet black, but in the bright sun it may have a brownish tinge. It grows sometimes to the length of six or eight inches. The smaller *medicinal leech* is cross-barred with brown and black. This kind is most often found in clear running streams attached to the under side of stones. Turtles often have leeches attached to the underside of their shells. Scientific name of medicinal leech, *Hirudo medicinalis*; of horse leech, *Aulastoma gulo*.

LEEDS, ENGLAND. For centuries England has been noted for the quality of its woolen cloths, the manufacture of which centers in Leeds. This is the sixth largest city in England and the second largest in the great industrial county of Yorkshire.

Leeds owes its commercial importance to its transportation facilities and its situation on the edge of the great Yorkshire coal fields. The river Aire connects it with the east coast, and the Leeds and Liverpool Canal provides cheap transportation to the west coast. The iron manufactures are nearly as important as the woolen. In the manufacture of boots and shoes, felt, ready-made clothing, artificial silk, glass, and pottery, Leeds also ranks high. Linen making from flax grown in the Yorkshire region is another important industry. The city is also noted for its fine university and for the great music festival which is held there every three years.

A suggestion of its interesting history, which goes back for 13 centuries, is preserved in the ruins of

Kirkstall Abbey—a Cistercian foundation of the 12th century—which now stand in the midst of a factory district. Population, about 485,000.

LEIPZIG (*lip'sik*), GERMANY. Strategically situated at the junction of two medieval land routes that traversed Europe from north to south and from east to west, this old city has been important both commercially and intellectually for many centuries. Today it is the cultural and economic center of the German Midlands and the metropolis of the state of Saxony. The huge Leipzig Sample Fair, held every spring and every fall, brings buyers from all over the world, who may order anything in its vast halls from the heaviest machines to the smallest luxury articles. It is a survival of the early medieval market, held at this crossroads of the caravan routes across the continent.

Leipzig is the great book center of Germany, noted not only for the production and sale of books, but for its state institution for teaching book production, the art of book decoration, and bookselling, and for the book treasures in its libraries. It is also a music center. It was once the home of Schumann and of Bach, who was organist at St. Thomas Church, and is the birthplace of Wagner. The University of Leipzig, founded more than 500 years ago, is one of the most important of German universities.

Many famous battles have been fought near Leipzig, especially the battle of 1813 in which Napoleon was crushingly defeated. It suffered six sieges during the Thirty Years' War. In 1519 it was the scene of a different sort of battle, the "battle of wits" between Luther and Eck. Population, about 700,000.

The "NEW LEISURE" and Its PROBLEMS

LEISURE. We sometimes think of leisure as a product of modern civilization. This is not wholly true. Primitive peoples had leisure, and certainly more advanced non-industrial or pre-industrial peoples also had leisure. Indeed, most of our social progress, most of the arts of life, most of

our science and literature, are, in a sense, products or by-products of leisure. They were produced in the margins of time left after the activities required to provide for the bare necessities of primitive life. These margins of time were the property either of the whole social group or else of a special privileged class—a so-called "leisure class." It may be said, therefore, that earlier ages knew and had leisure; but they did not have enough of it to create a "leisure problem." In modern society, particularly in our western industrialized society, the rapid increase in

THE manner in which the hours of freedom are spent determines, no less than labor or war, the moral worth of a nation.—Maurice Maeterlinck.

It will be a far more difficult task of civilization to teach men to use leisure rightly than to instruct them how to labor efficiently.—John H. Finley.

There is no problem before the world today more important than the training for the right use of leisure.—Elihu Root.

The moral and spiritual forces of our country do not lose ground in the hours we are busy on our jobs—their battle time is the time of leisure.—Herbert Hoover.

leisure time has brought pressing problems that challenge our best thinking. We must plan for our leisure no less than for our work.

It is sometimes assumed that leisure chiefly concerns children and youth. Inasmuch as boys and girls are about one-third of the American population, and

their leisure time occupies from 40 to 50 per cent of their waking hours, providing for their leisure is indeed important. But it is only a part of the problem. Leisure concerns everybody without distinction of age, sex, or class. Its use is a vital problem to the handicapped, the sick, and the aged; to those confined in prisons or other institutions; to the unemployed who have had leisure forced upon them; and to the many persons who have voluntarily "retired" from active life.

Some margin of leisure is a basic need of human

beings. Nature works rhythmically, with alternating periods of activity and rest. Both plants and animals seem to require rest periods. Growing children and children at play manifest such rhythms. Human civilization can be interpreted as the history of man's efforts to provide more and more generously for meeting human needs within these alternating periods of activity and quiescence.

Primitive Peoples Have Little Leisure

Romantic popular writers used to picture primitive man as a happy savage enjoying abundant leisure. This widespread delusion probably grew out of the mistaken idea that people living in the tropics had nothing to do but open their arms to receive nature's gifts. This may be true in some instances; but, speaking generally, the life of primitive people was and still is filled with hard work to gain a bare subsistence. One reason why primitive people have remained primitive is that in spite of their hard work they have not been able to store up sufficient margins or reserves out of which to secure leisure with its attendant cultural advantages.

During the handicraft stage of human history neither much capital nor much leisure was possible. Most farmers today are still living in this stage; it is a common saying that the farmer works from sun to sun, or, as the phrase goes in the West, "from can till can't." The opening stanza of Gray's 'Elegy' pictures the fatigue and the long hours of a typical European farmer. Other employments of the pre-machine age required equally long hours. In China, for example, more than 70 per cent of the working people still work seven days in the week and from 10 to 14 hours a day.

Our Working Day Grows Shorter

The last century shows an almost world-wide tendency, particularly where machine industry has a foothold, to reduce the hours of labor and hence to increase leisure time. In 1800 a 12- to 16-hour day was common. At the present time 8 hours is considered a standard working day in most industrial countries; and there is a tendency, particularly in the United States, to reduce the working period still further, to a five-day week of somewhere between 30 and 40 hours. According to figures issued by the American Federation of Labor, between 1840 and 1930 American work hours per week declined by one-third (from 72 hours to 48), while leisure time tripled (from 12 hours to 36).

The increasing efficiency of machine production has also forced involuntary leisure upon millions of people. During the depression of the 1930's, between 8,000,000 and 14,000,000 workers in the United States were thrown out of employment. The International Labor Office at Geneva during this same period reported nearly 50,000,000 unemployed in the nations represented there. The problem of unemployment is not confined, however, to capitalistic machine industry. In agricultural India, some 75,000,000 peasant farmers remain idle seven months out of

every year. This involuntary leisure is the result partly of climatic conditions, partly of the old tradition that only one crop a year can be grown. Thus, both agricultural and industrial conditions may cause involuntary leisure.

How Machines Create Leisure

Here is a striking example of how machine production brings large gains in potential leisure: An English expert calculates that to write by hand a typical volume of 100,000 words would require 14 days and cost approximately \$54.50; a hundred copies would take 4 years, 25 weeks, and 2 days; a thousand copies, 44 years, 45 weeks, and 2 days. By power press it takes about 96 days to produce the first printed copy; a hundred copies takes less than a minute longer; a thousand copies only 12 minutes more. And the cost of a thousand copies is only 20 cents more than the cost of one copy. In other words, the power printing press reduces the time needed to produce a thousand copies of a book from 45 years to 3 months, and cuts the cost from \$5,450,000 to about \$1,000. The printing press, has, therefore, not only increased potential leisure by releasing labor power, but it has also provided low-priced reading materials for improving this leisure.

Leisure has been similarly increased by improved methods of production in other lines. It has been estimated that a man now produces ten times as much iron in one working day as he could in 1781, five times as much lumber, eight times as much coal, a hundred times as many nails, and ten thousand times as much paper. A brick-making machine turns out 40,000 bricks a day, the former output of nearly 400 men. (See Machinery.)

This same productive increase through machinery is seen on the farms. In 1800 a man with a sickle could cut half an acre of wheat a day. With the cradle scythe a man in 1831 could harvest two and a half acres a day, "if he was a man of iron." With the reaper of 1840 he could cut six acres a day, but five men had to follow his machine to bind and shock the grain. With the binder of 1880 he could cut 20 acres a day, and the machine bound the grain. With the tractor of 1922 and two binders he could cut 40 acres a day; and with the combine used on large wheat farms today one man can cut 40 acres a day and dispense with the labor of about 50 men otherwise required to bind, thresh, and sack the wheat. (See Agriculture.)

Higher Standards of Living

Improved farming and mechanized industry have also increased the worker's income; this is of tremendous significance for leisure. In the United States, thanks to great natural wealth and these improvements in industrial technique, a worker can maintain a standard of living far above that possible in non-industrial countries, and with smaller expenditure of time. Thus, the purchasing power of its 130,000,000 inhabitants exceeds that of 500,000,000 Europeans and far exceeds that of 1,000,000,000 Asiatics. In

A LEISURE-TIME PURSUIT FOR YOUNG AND OLD

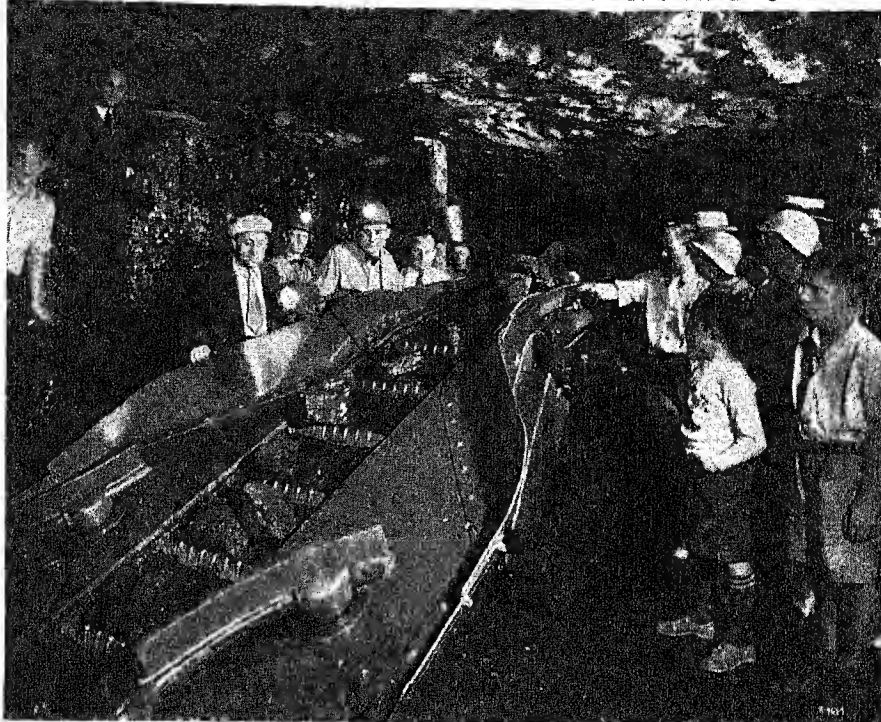
countries like India or China most of the worker's time goes into satisfying his food necessities. Formerly in the United States 90 per cent of all the people were engaged in raising the food supply. Under modern conditions fewer than 30 per cent of the people are needed to produce food, and with the most modern machinery only a third of their time is required. In other words, less than ten per cent of the human energy in the United States is required for food production. The result has been an enriched standard of living and the accumulation of surplus income and capital which can be devoted to satisfying desires for leisure and recreation. Other countries with a highly developed machine industry have made similar gains in time and money for the workers.

These income improvements mean increased opportunity to enjoy voluntary leisure and to obtain the means of making that leisure worth while. Leisure itself and the provision of recreational facilities are in a very real sense becoming "commodities," and might well be considered as a part of "real wages."

It is not only the men and women in industry whose hours of labor have been shortened. The old saying, "Woman's work is never done," no longer holds good for the housewife. The machine age has revolutionized her work as well as that of the wage earner. Labor-saving and time-saving devices have speeded up such tasks as cleaning and cooking. Inexpensive factory-made clothing has released her from long hours of sewing. In cities especially, changes in ways of living, from large houses to small heated apartments and hotels, have cut down tremendously the labor of keeping up the home. And so the housewife as well as her sister in industry finds herself with many added hours of leisure.

How the New Leisure Is Spent

When we speak of "the new leisure," we have in mind two significant aspects: first, the increase of leisure time, actual and prospective; second, the trans-



This interested group of people has discovered a fascinating leisure-time activity. Far from the scene of an actual coal mine, they are learning how every operation of the miner's work is performed, as they travel through the model mine in the Museum of Science and Industry in Jackson Park, Chicago. Half a million people visited this museum during the first year that it was open. During six school months of that year, 40,000 children in organized groups visited its many exhibits. That the American public has learned something about the wise use of leisure time is evidenced by the throngs who visit such institutions as libraries, museums, zoological gardens, and aquariums each year. This picture shows coal miners, employed as guides, demonstrating the operation of a coal-loading machine.

formation of the old traditional leisure-time activities and pursuits by our modern industrial city life. Before machine industry changed the face of the western world, most leisure time was spent either about the home or in the neighborhood. The average daily job was marked by a very leisurely tempo, and sometimes in itself provided a certain amount of recreation. Machine industry has considerably changed the character of the job itself. We often hear that machine production is just monotonous machine-tending, meaningless repetition of the same motions; that it tends to make a mere "hand" out of the worker. When a worker puts in eight hours a day doing nothing but thread a needle, or cut a slit for a button-hole, or place a nut on a certain bolt, he gets little pleasure and satisfaction out of his job. His day is separated into separate compartments labeled "work" and "free time," and his inclination is to concentrate into this free time all the recreational interest which in the old handicraft system may have been distributed over the whole day. He is likely also to seek exciting amusements which take him out of the home and even out of the neighborhood. He wants the excitement of the clubhouse, the public park, the community center, or the theater and other places of commercialized recreation.

Leisure is a broader term than rest, recreation, idleness, loafing, or amusement. As one writer puts it, "It is the free part of the imagination." That is, leisure is not just so many hours or minutes of time which are not actively used in making a living; leisure is a mental attitude towards the whole round of life activities. While machinery and shorter hours can put more spare time into modern hands, they cannot guarantee any increase of relaxation, freedom, or happiness.

How do people spend their leisure time? The National Recreation Association reported on the leisure hours of 5,000 adults in cities and towns of the Northeast. This study showed that the ten activities most frequently engaged in were newspaper and magazine reading, listening to radio, attending movies, visiting or entertaining, reading fiction, auto riding for pleasure, swimming, writing letters, reading non-fiction, and conversing. The home evidently still occupies an important place as a recreational center, since the most common activities are engaged in at home; and the home apparently becomes more important as a leisure center for people as their age increases.

Another answer to the question of how leisure is spent may be given in terms of expenditure. Out of every hundred dollars spent for recreation in a typical year, \$23.50 went for theaters, \$16.90 for personal sports, the same amount for radios, \$16.80 for foreign travel, \$12.90 for "amusements," \$4.20 for commercial sports, \$3.80 for phonographs and other music and musical instruments, and \$5.00 for miscellaneous recreation.

Since many of the leisure-time activities enjoyed in the home cost little, a mere dollar statement may not give the home its real place in the recreational picture. With the growth of interest in the radio and indoor games, even the city apartment offers an offset to the tendency to seek recreation outside the home.

What Leisure Costs

The use of the phrase "leisure as a commodity" appears justified from the outlay of time, facilities, and money made to satisfy leisure-time interests. For example, nearly eight per cent of the total area of a typical suburban district like Westchester County, N. Y., is given over to recreational purposes. Every year the people of the United States spend at least one-ninth of their total income on leisure-time activities. In prosperous years this amounts to about ten billion dollars. Put it in another way: the people of the United States spend every year about 6 weeks' income out of 52 on play, amusements, and other leisure-time pursuits.

Americans spend as much on operating their automobiles, we are told, as they do for public education. Between 10 and 15 billion dollars is invested in pleasure automobiles; probably 2 billion more has been spent on radios; the 5,000 golf courses in the United States stand for an investment of \$1,500,000,000; the motion-picture industry represents an investment of several billions, attracting 20 million Americans every day; football costs 50 million dollars a year, in addition

to a vast capital outlay for stadiums and other equipment. The capital invested in public parks in the United States totals over a billion dollars, and the annual maintenance cost runs over 100 million. In Chicago, it is estimated, 100 million dollars has been invested in various forms of commercial amusement and recreation, including moving-picture theaters, swimming pools, clubs, stadiums, and baseball parks. Chicago's museums, parks, playgrounds, and various other non-commercial facilities for recreation represent a further investment of nearly 350 million dollars. It costs the people of Chicago about \$100 per capita every year for recreation, play, and amusement.

Public Provision for Leisure Interest

Before 1850 almost no provision was made for public recreation in the United States, and such facilities increased at only a slow rate during the rest of the century. Since 1900, however, the function of providing recreation has been generally accepted as a public responsibility. The per capita expenditure by cities doubled within a quarter of a century. From about 1907 to 1930 the park acreage of the average city of around 30,000 increased 237 per cent, against a growth in population of only about 65 per cent. Between 1910 and 1930 the number of cities with playgrounds quadrupled and the number of playgrounds increased six-fold. Throughout the country, school playgrounds are beginning to be considered an absolute essential. Even the state and federal governments have become interested in providing for recreation. National parks now cover an area larger than the entire state of Maryland, and they are visited by some 3,000,000 people a year. Millions more enjoy the vacation opportunities of the national and state forests and the state parks.

The Future of Leisure

In the future we are likely to have more leisure rather than less. Whether or not we reach the four-hour working day predicted by optimistic engineers and economists, it is evident that machine technology tends to increase production with less expenditure of time and energy. This is likely to mean shorter working hours for the average employee and perhaps the active employment of a smaller proportion of the total population at any one time. It may also mean that the age at which youth may be employed for wages will be raised and that the age at which people normally retire from active employment will be lowered. Thus, at both ends of the age scale, large new blocks of leisure will be released and must be provided for.

Leisure may be either a tragedy or a blessing. Leisure spent wholly in idle amusement may deteriorate mental efficiency and impair health. Leisure time spent in self-improvement, in developing special talents, and satisfying other worth-while interests, will enrich life and bring new powers of enjoyment.

The question of what to do with this new leisure of the masses is receiving the serious consideration of employers, of government agencies, and, above all,

of educators. We hear much today of "education for leisure." It is recognized that training in this field should begin at an early age—that the education of boys and girls must develop interests and habits that make for a richer and more satisfying adult life; that it should "stimulate intellectual curiosity and sympathy and foster the growth of avocational as well as practical interests and open up a wide field for the delights of the eye, the heart, and the mind." We find "the worthy use of leisure time" listed with vocational training, education for citizenship and worthy home membership, and health education as one of the major objectives of education in the schools.

What the Schools Are Doing

Some fine beginnings in this direction have been made in the American schools through reading, music and art appreciation, drama, sports and games, and courses in the manipulative skills. Pupils are early introduced to the delights of "free-time" reading, and we find them during their leisure hours eagerly reading not only good fiction but interestingly written informational material. Opportunities are given for creative work which discovers the talents of individual pupils, and young people are being encouraged to develop their various talents. Excursions to museums and other institutions of this character are opening up the fascinating possibilities in this type of leisure-time activity. The suggestion of pursuing an interesting hobby is another activity that always brings enthusiastic response (*see Hobbies*). These and many other interests that will carry over into adult life are being developed in progressive schools. And in all this education for the worthy use of leisure time, recreation and real play are not being neglected. An effort is being made to stimulate pupils' interest in the best kinds of sports and to help them to choose the best motion pictures and other worth-while amusements from the many forms of commercial entertainment.

The Need for Social Planning

Wise social planning will help us take advantage of the wide distribution of leisure. It will make special provision for our two largest "leisure classes"—pre-vocational youth at one end of the age scale, and the retired worker on the other. The latter class in particular demands consideration, since the proportion of the elderly relative to other age groups is rapidly increasing because of the decline of the birth rate, the advance of public health, and other factors. The old must be helped to make satisfactory use of their added fund of leisure, lest it become mere prolonged misery.

Many problems remain to be solved. Nobody has worked out an acceptable formula for division of responsibility among public institutions, private agencies, and commercial operators for taking care of leisure-time needs. The place of the public-school system and of the library in this work is not yet entirely clear. The question of governmental censorship and interference with the "sale of unwholesome recreation" is also a pressing one.

Thus it is evident that leisure is now a national problem which must be solved by broad-gauge planning. For example, with half the population of the United States clustered in 96 metropolitan areas, the development of public recreational facilities must evidently now be planned on a regional rather than on a merely local basis. This field offers a worthy challenge to planners and inventors, since the problems range all the way from devising suitable toys for babies to locating and equipping playgrounds, building community centers, expanding public-school recreation, coordinating parks, play centers, and school grounds, and enlarging the state and national park systems.

Good books on the leisure problem are: 'Leisure in the Modern World', by C. Delisle Burns; 'The Threat of Leisure', by George Barton Cutten; 'The Wisdom of Leisure', by John H. Finley; 'The Challenge of Leisure', by Arthur Newton Pack; 'Americans at Play', by Jesse F. Steiner; 'Time to Live', by Gove Hambidge; 'Education Through Recreation', by Lawrence P. Jacks.

LEMON. The demand for lemons increases by leaps and bounds as the mercury rises, for in the long hot days of summer nothing is more refreshing than a glass of sparkling lemonade, with ice tinkling in its cooling depths. In Italy, Sicily, Corsica, and other parts of southern Europe, particularly in Spain and Portugal, lemon culture has been a large commercial industry for many years. European markets still look to these districts for their lemons, but the United States imports fewer every year because of the increase in lemon cultivation in California. The lemon industry in Florida until the cold wave of 1894 was of considerable importance, but since that time the great development of lemon culture has been in the irrigated lands of southern and central California, where lemons of superior quality are grown in ever increasing quantities.

The lemon is a close relative of the orange and has followed it all over the world. The straggling branches of the lemon tree, however, are very unlike the compact dense foliage of the orange, and the purplish flowers have not the agreeable fragrance of the white orange blossoms. The lemon is much less hardy than the orange and the area of cultivation is more restricted. It is cultivated and propagated in much the same manner as is its close relative the orange (*see Orange*).

If lemons ripen on the trees they lose their keeping quality, and so they are picked green before there is any sign of the golden yellow coloring. Each picker has a little ring $2\frac{1}{4}$ inches in diameter, and the fruit is cut when it can just slip through the ring. From the moment the lemons are harvested they must be "handled as carefully as eggs." In dark storehouses, well ventilated but free of drafts, they are carefully spread out and slowly ripened. In curing, the fruit shrinks a little, the skin becomes thinner and tougher and develops a silky finish. When the process is completed the lemons are washed, dried, and wrapped in tissue paper. In this condition they will keep for

months, which is a very good thing for the growers, as most of the fruit ripens in the winter and the great market demand is in the summer.

The lemon is used in more different ways than any other of the citrus fruits. From the rind, lemon oil or extract, used in flavoring and perfumery-making, is obtained either by expression or distillation, and candied lemon peel is made. The pulp yields citrate of lime, citric acid, and lemon juice. Besides its use in flavoring foods and drinks of various kinds, lemon juice is much used by calico printers to produce greater clearness in the white parts of patterns dyed with dyes containing iron.

Scientific name, *Citrus limonia*. Fruit probably introduced into Europe from Asia about the same time as the sweet orange. The tree flowers continuously and the trees contain flowers and fruits in all stages of development most of the year. Like the apple and orange, it varies exceedingly under cultivation. The lemon tree is exceedingly fruitful, some of the large old trees of Spain and Sicily ripening as many as 3,000 fruits in a favorable year.

LEMURS. Small monkey-like animals, the size of cats and squirrels, with big eyes, foxlike faces, and doglike nostrils—such are the lemurs. The name comes from the Latin *lemures*, meaning "ghosts," and is given them because of their nocturnal habits, their shy silent ghostlike movements, and their love of forests and darkness.

Lemurs are the lowest of the primates, the group which also includes monkeys, apes, and man. Most of them have tails, but they cannot hang from trees by them as some monkeys can.

With their numerous relatives, lemurs form the family called *lemnroids*. Of the 90 or so species of *lemnroids*, 50 or more are in Madagascar. All are restricted to the southern regions of the Old World—Africa, India, Ceylon, the Philippines, etc.—but only in the islands of Madagascar and Comoros are the true lemurs found. Interesting forms with local names include the beautiful but noisy ring-tailed lemur, whose bushy tail is marked with alternate rings of black and white; the large *indri* or *babakoto* ("little old man") of Madagascar; the dark iron-gray *gentle lemurs* which frequent the bamboo jungles; and the "aye-aye" of Madagascar, so named from its cry. Fossil remains of *lemnroids* are found in many lands, including North America. *Lemnroids* in general eat leaves, fruits, insects, small reptiles, birds, and birds' eggs. (See Monkey.)

LENIN, NIKOLAI (1870-1924). When the Red Terror of the Bolsheviks was raging in Russia in 1917-18, a short stockily built man, bald-headed, with steel-gray eyes peering beneath the broad brow of a scholar, sat within the Kremlin at Moscow directing the activities of the Soviet government, of which he was the head. It was Lenin, whose real name was Vladimir Ilyich Ulianov. Although the son of a councillor of state, he had been a revolutionist since his youth. When he was 17 years old his brother was hanged for plotting to kill the czar, and when he was 26 he himself fell into the hands of the imperial government and was exiled to Siberia. Following the

expiration of this sentence, being forbidden to reside in any of the large cities of Russia, he lived in Munich, Brussels, Paris, London, and Geneva. He became widely known through his authorship of several scholarly but radical works on economic topics. After 1903 he was the recognized leader of the wing of Russian socialists who called themselves Bolsheviks.

When the government of the czar was overthrown in 1917, he returned to Russia, and replaced the mild socialist government of Kerensky with one of extreme radicalism. His enemies accused him of accepting German aid and money. Indeed, to serve its own ends, the German staff had given Lenin and a few other Russian radicals their homeward passage in a closely guarded train from the Swiss frontier across Germany. Yet there is no proof that Lenin took German money to disorganize the Russian army. Lenin favored immediate peace with Germany, to prepare the way for a world revolution directed against all capitalist and imperialist governments. Nothing else mattered. He called upon the working class to rise up and seize control of the land and industries, and establish the "dictatorship of the proletariat." The result was the Russian Soviet Republic, with himself as premier and Trotsky as minister of foreign affairs and war.

Possessed of one idea to the point of fanaticism, Lenin throughout his life showed himself a man of relentless determination and iron courage. Wounded by an assassin's bullet in August 1918, he recovered quickly. At the height of his power he continued the simple life of his long years in exile. Lenin, the scholar who spoke three languages and read three more, provided the brains of the Soviet experiment, as Trotsky furnished the fiery spirit and the genius for military organization. Lenin's driving energy finally wrecked even his strong constitution, and he died Jan. 21, 1924, at Gorky, near Moscow, after a long siege of paralysis. His grim granite tomb at Moscow has become the objective of pilgrims from all over Russia. There his khaki-clad body rests in what appears to be a state of perfect preservation.

LENINGRAD. When Peter the Great founded this city as the capital of Russia in 1703, he called it "St. Petersburg," after his patron saint. But the Russians disliked this Germanic name and during the first World War changed it to "Petrograd," *grad* being a form of *gorod*, the Russian word for "town." In 1924 the Soviet government changed it again to "Leningrad," in honor of Lenin, leader of the Revolution.

The site of the city, at the mouth of the Neva on the Gulf of Finland, has been important as an outlet for trade since ancient times. The country, however, was only a desolate marsh, dangerously exposed to floods and storms, and the idea of building a city there seemed preposterous. But Peter the Great was determined. "I want a window to look out upon Europe," he said. And so, in 1702, as if by magic, at command of the Czar, the "window" started to take shape. Human life was cheap, and thousands of peasants were brought there to die of disease and hardship

as they sank the forest of piles for the city's foundation. So many perished that the city is said to be "built upon bones."

Peter had traveled in western Europe, and wanted his capital to be magnificent. The major portion was to stand on a peninsula where the Neva arched to the northward, then turned southwest to the Gulf of Finland. On the left, or southeast, bank of this last portion rose the Old Admiralty in a magnificent square. Adjoining this square stood the Winter Palace, while across the river on an island rose the grim fortress of St. Peter and St. Paul. The principal streets radiated from this center, and included the Nevsky Prospekt, meaning "view of the Neva." This

street, one of the most magnificent in the world, ran roughly southeast to join the road to Moscow. The islands in the river were linked by bridges, and canals helped drain the site. Palaces were lavish, and a court life, the most brilliant in Europe, grew up, amid unbelievable extravagance. In Peter's day the harbor was at Kronstadt on the island of Kotlin, some 20

WHERE PETERHOF'S BRIGHT FOUNTAINS DANCED



In 1720 Peter the Great built this grand palace set in vast formal gardens in the little town of Peterhof a short distance west of Leningrad. Like many of the other buildings of Leningrad, the palace (then a museum) was destroyed by the Germans during the second World War.

miles to the west; but a channel cut through to deep water in 1885 let ships reach the city.

But there was also an abject poverty which contrasted strikingly with the brilliance of the court. The atmosphere of the city was tense with repression, fear, contempt, and hate; unrest grew rapidly. There was a strike of textile workers in 1749; the Dekabrist

mutiny took place in 1825; and sporadic uprisings occurred during the next century. There was revolution in 1905, and in 1917 came the two revolutions which finally established the present Soviet state.

The glamorous palaces and the fine houses of the aristocrats have now been converted to other uses. Some are museums—museums of the bygone imperialism. Some are hospitals, schools, day nurseries, or club rooms. The colossal Winter Palace—the largest palace in Europe—has become the Palace of Art and Museum of the Revolution. This mammoth building, which was begun in 1754 and completed ten years later, was the residence of the czars. It housed 6,000 people. Connected with it is the Hermitage Fine Arts Gallery, which still boasts one of the richest art collections in the world. Not far

LENINGRAD'S MOST FAMOUS STREET



This is the Nevsky Prospekt of czarist days, now called the Prospekt of the 25th of October in honor of the Bolshevik capture of the Winter Palace on that date in 1917. The street is noted chiefly for its great width, about 130 feet. Few of the houses are impressive. Many such bridges cross the Neva, its branches, and its canals in Leningrad.

WHEN SOVIET RUSSIA GOES SHOPPING



Here is a government supply station with its usual line of patient customers waiting their turns to buy. Many of the fine shops, which before the Revolution rivaled those of Paris in their displays of luxury goods, have been converted into these government depots selling now the plainest of necessities.

away is the Court Stables Museum, with one of the rarest displays of court carriages in existence. There are also the Russian Museum, with its vast records of Russian history, culture, and religion; the Central Naval Museum, housed in the famous Admiralty; the Agricultural Museum; the Children's Welfare Museum; the Tolstoy Museum; Pushkin Museum; and museums of People's Health, Commercial Navigation, Musical Instruments, Home Industry, Applied Arts, and Comparative Religious Thought. The list of museums is almost endless. The people take a remarkable interest in them, and every day groups of children study the collections.

The city was formerly the educational center of all Russia. Large numbers of foreign students came, too. Even after the trying years of the Revolution, it retained much of its reputation for scholarly achievement. The Academy of Sciences and the State Public Library are world famous. Among the many institutions of higher learning are the Leningrad State University, the Communist University for National Minorities, the Polytechnical Institute, and the Academy of Fine Arts.

After 1917, Leningrad languished. Revolution and counter-revolution, the threat of invasion by foreign armies, floods and famine, and the removal of the capital to Moscow in 1918, left the city drab, cheerless, deserted. The population decreased from more than 2,400,000 in 1916 to less than 725,000 in 1920. Fashionable shops were boarded up. Row after row of empty houses stared through broken windows to empty streets. The beautiful women in costly furs,

the military leaders in resplendent uniforms gave place to shabbily dressed workers.

A drastic effort was made to revive the city. The government erected a number of new factories, and population increased. Production of textiles, rubber goods, and shoes grew enormously. Metal and machinery manufactures increased. Chemicals, clothing, paper, furniture, matches, tobacco, leather goods, and alcoholic drinks also were manufactured. Special railroad arrangements were made with Latvia, and trade with Riga expanded. Leningrad recovered much of its prewar trade. Among its exports are timber, grain, flax, hemp, linseed, copper, bristles, vegetable oil, furs, leather, skins, and spirituous liquors.

The climate is cold and damp, and subject to sudden changes. Rain and snow fall nearly half the days of the year, and the

Neva is frozen for six of the twelve months. Terrible floods are frequent in spring. The average temperature is 38.6°, with a six weeks' summer. Population, about 3,195,000.

LENS. If you take the lens of an ordinary magnifying glass and hold it to the sun in such a way that the rays of sunlight passing through the lens form a tiny bright spot on a piece of wood or paper, the wood or paper will start at once to smoke and smolder and, if the lens be held in position long enough, flames will burst forth. In this experiment the rays from the sun that reach the lens are bent inward as they pass through the glass and converge to a *focus* in a small area. All the heat energy of these rays, centered in one place, is sufficient to start a blaze. This action is illustrated on the next page, Fig. 1.

But it is not as "burning glasses" that lenses are chiefly useful. They bend and focus light rays as well as heat rays, and it is for this purpose that they are used in telescopes, microscopes, and cameras. The little bright spot produced by the burning glass is actually an image of the sun's face, focused in the same way as every image is focused by a photographic lens.

Most of these principles of the lens can be demonstrated with an ordinary magnifying glass. Hold it close to some small object and the object will appear much larger than it is. Hold it at arm's length and look through it at some distant object and the object will appear upside down and much smaller. Go into a dark corner of a room and let the light from the window shine through the lens upon a piece of paper.

By moving the lens backward and forward, you will soon be able to cast upon the paper an inverted image of the brightly-lighted window and the scene outside.

The accompanying diagrams explain these differences in the action of a lens. We must remember we even after a ray of light has been bent out of its course, it still *appears* straight when it falls upon the eye. In Fig. 2 we see the effect of plain magnification. The rays from the object coming together at the eye seem to the eye to have come from an imaginary and much larger object.

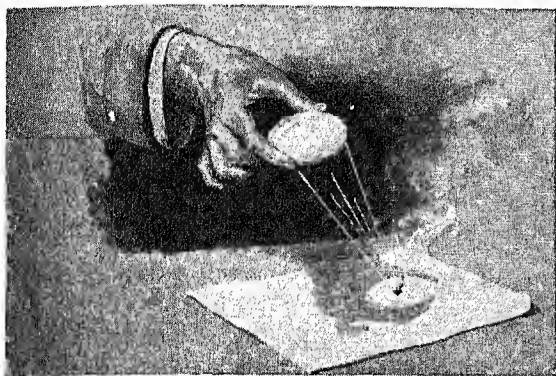


Fig. 1—The Lens as a Burning Glass

The manner in which the inverted image is formed on the white paper is a little more complicated. In Fig. 2 we assumed that all the rays of light from the object were parallel to each other. In fact, of course, light rays spread out in every direction from any lighted point, as shown in Fig. 3. From the points *A* and *B* parallel rays pass through the lens and are bent so they cross each other at *C*. But other rays from *A* and *B* pass through what is called the *optical center* of the lens at *F*. These are not bent, but pass straight onward, and meet the first two rays at *D* and *E*. It is at this meeting place or "focus" that

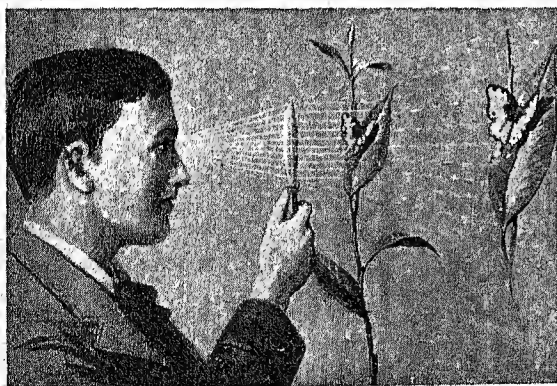


Fig. 2—Magnification with a Lens

the image of the object *AB* is made on the paper, only that it is now upside down. Of course, rays from every other part of *AB* do the same thing and

form a corresponding part of the image *DE*. The plane on which the different points of the image come to focus is called the *focal plane*, and it is in this plane that photographic plates are mounted.

The magnifying lens we have been considering is only one of many forms. Its two sides are sections of equal spheres, and such a lens, which is always thickest in the middle, is known as a double-convex lens. Other lenses may have both sides concave and thus be thickest at the edges; or one side of the lens may be flat and the other concave or convex.

In general the concave lenses, instead of converging the rays of light to a point, spread them out or diverge them in just the opposite way. For this reason objects seen through a double-concave lens appear right side up and smaller than they really are. By varying the curvature of the surfaces of lenses differences in focal length are obtained; that is, differences in the distance between the optical center and the focus. They may be ground also to throw distorted images, as in the case of spectacle lenses which are adjusted to combine properly with the lenses of the eyes. If the shape of the eye lens is distorted by

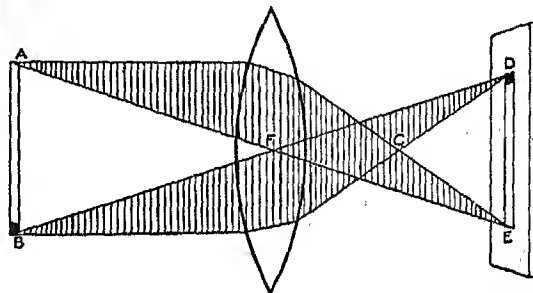


Fig. 3—Forming an Inverted Image

what is called "astigmatism," the spectacle lens is distorted in the opposite manner and the combination of the opposed distortions produces a normal image on the retina (see Spectacles).

The general optical law which governs the use of lenses is called the law of the refraction of light, and it may be summed up as follows: When a ray of light passing through a lighter medium (air) strikes the surface of a denser medium (glass) at an oblique angle, the ray is bent or refracted *toward* the perpendicular to that surface, and when it passes out again from the denser glass to the lighter air, it is bent *away* from the perpendicular to the second surface (see Light). The diagrams illustrate this law clearly.

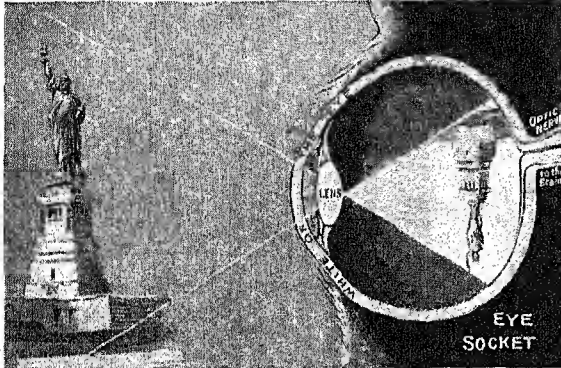
Lenses are combined in optical instruments for various purposes. For instance, the enlarged image produced by one magnifying glass may be passed through a second lens and enlarged again, giving us the principle of the microscope (see Microscope).

For accurate work lenses are usually made of two or more layers of different kinds of glass closely cemented together. This is done to correct color aberration or the tendency that any special kind

of glass may have to separate the light rays into colors and so form an imperfect image, one surrounded with color. Crown glass, for instance, is used with flint glass, and each corrects the aberration of the other.

The manufacture of high-grade lenses is one of the most delicate of all mechanical operations. The curvature of the surfaces must be mathematically perfect, and they must have an extremely high polish to

LENS ACTION OF THE EYE



The retina lies in the focal plane of the adjustable crystalline lens and receives an inverted image.

prevent any stray light ray from wandering out of its proper course. The difficulties increase as the lenses grow larger, and the immense glasses used in big telescopes require months and even years of labor and experiment in their preparation. A tiny air bubble in the glass or the stroke of a workman's gritty finger over the surface may spoil everything. The surface of a lens is shaped by grinding the glass in an iron mold. Finer and finer grinding materials such as powdered emery or carborundum are used in succession, ending up with a red iron peroxide called "rouge," which gives the lens its high polish. (See also Camera; Photography; Telescope.)

LENTIL. This food plant, akin to the bean and pea, is said to be one of the oldest cultivated by man, and it still is an important article of food in Egypt, Syria, Mexico, etc. The seeds, which are round and flat and under a half-inch in diameter, are made into soup or eaten boiled. The "pottage" for which Esau sold his birthright is said to have been made of these legumes. The vines make excellent fodder for cattle and sheep. Most of the lentils consumed in the United States come from Mediterranean countries.

LEO, POPES. The first of the 13 popes of this name is well called **LEO THE GREAT** (Pope, 440-461) because of his learning and the important part which he played in the theological controversies of the time. (For the story of how he turned back from Rome the fierce king of the Huns, Attila, see Huns.)

LEO III (Pope, 795-816) is chiefly remembered because it was he who placed the imperial crown on the head of Charlemagne, on that memorable Christmas day of the year 800 (see Charlemagne). **LEO IV**

(Pope, 847-855) did much to repair the damages done to Rome by the Saracens, and extended the walls of the city to include the Vatican quarter, on the right bank of the Tiber. **LEO IX** (Pope, 1049-1054) was a German, renowned because of his zeal in spreading the reforms of the monks of Cluny. He became pope through the influence of Emperor Henry III, and brought with him to Rome a young monk Hildebrand, who afterward became the great Gregory VII—the author of the investiture conflict with the emperors.

LEO X (Pope, 1513-1521) was a member of the rich Medici family of Florence, the son of Lorenzo the Magnificent, and was made a cardinal-deacon at the age of 15. The wise and affectionate counsel which his father gave in a letter when the boy first set out for his duties in Rome still exists. He was elected pope on the death of Julius II, at the age of 38. His reign saw the beginning of Luther's revolt against the church, increasing danger to eastern Europe from the Turks, and a continuance of the political struggles and wars involving the Papacy begun by his predecessor. But Leo X is chiefly remembered for his part in the Italian Renaissance, as the liberal patron of Raphael and other artists, and of numerous scholars, poets, and other literary men. It was he chiefly who made Rome the successor of Florence as the literary and artistic capital of Europe.

LEO XIII (Pope, 1878-1903), the latest to bear this name, came to power at a time when the papacy had recently been deprived of its "temporal power" as ruler of Rome and the surrounding country. Like his predecessor, Pius IX, he refused all offers of compromise with the new kingdom of Italy, and remained a "prisoner" in the Vatican. He was a man of wide culture and high character, and in many things showed himself a liberal statesman, though he never ceased to uphold the necessity of restoring to the papacy its temporal power.

LEOPARD. This spotted animal of the cat family inhabits Africa, Asia, and the large islands of the Malay Archipelago. It is smaller than the jaguar,

THE SNOW LEOPARD



This animal, sometimes known as the "ounce," is a resident of the mountains in central Asia.

being about four feet long with a tail three feet in length. There is considerable variation among leopards as to size and color. They usually are pale

fawn or tawny color with dark spots. The under surface of the body is somewhat lighter in color. There are also species which are solid black in color. The larger forms of southern Asia are commonly called "panthers." The leopard lives in the forests, and is a tree climber. It is agile and a remarkable jumper. It attacks the antelope, young cattle, pigs, and occasionally man.

The cheetah or hunting leopard of India is a slim species which is tamed and trained to aid in hunting. The ocelot is another leopard-like cat, with striped and spotted fur, found in tropical America and the southern United States. A full-grown animal weighs 25 pounds. (See Cat; Jaguar.)

Scientific name of common leopard or panther, *Felis pardus*; cheetah, *Gueparda jubata*; ocelot, *Felis pardalis*.

TALKING by MAIL—The Art of LETTER WRITING

LETTER WRITING. "I feel as though I were talking to you," wrote Cicero to a friend nearly two thousand years ago. That is the way to feel when you are writing friendly letters, because such letters are a kind of conversation carried on by mail and should follow the rules of conversation (see Conversation). They take our place when we are absent and should reflect ourselves. Write as you would talk; let your friends share your pleasures. Be natural and sincere in what you say and your letters cannot fail to please. Letter writing as an art began, so far as we know, with Cicero. His letters have the conversational quality and the personal touch that are found in the best letters of all ages.

Letters as a mere form of communication began long before Cicero's time. More than a thousand years before Cicero's time, the rulers of western Asia were keeping up a lively correspondence with the pharaoh of Egypt. A collection of some 300 of their letters written on clay tablets was dug up at Amarna, Egypt, in 1887. From Homer and Herodotus we learn that the ancient Greeks sometimes sent letters. But it was left for the Romans to develop letter writing into an art, since their able men had to spend years in governing distant provinces and could learn what was happening at Rome only from the letters of their intimate friends.

Letters as Literature, and Their Writers

Some letters have expressed so much of the charm and personality of their writers that they are regarded as part of the literature of the world. Two of the most famous letter writers in the English language are William Cowper, the poet, and Charles Lamb, author of 'Essays of Elia' and 'Tales from Shakespeare'. Neither led an exciting life, but they had an affectionate interest in their correspondents and found delight in writing about everyday scenes and events. Jane Carlyle, wife of the famous Thomas Carlyle, won a

place in literature by her lively letters. Another woman remembered for her letters is Madame de Sévigné, a Frenchwoman of the 17th century (see Sévigné, Madame de). Robert Louis Stevenson, William Dean Howells, and William James wrote delightful letters, and, to come nearer our own time, there are the remarkable letters of Walter Hines Page and Woodrow Wilson, and the sparkling correspondence between George Bernard Shaw and Ellen Terry.

Reading such letters will not only entertain you—for who does not enjoy reading a lively personal letter?—but will also inspire you to write more readable letters.

Ethics and Etiquette of Letters

Letters that have been published are for all to read, but other letters are private property. Well-bred persons never open a

A LETTER FROM LEWIS CARROLL



Ch. Ch. Oxford
Mar. 16. 1891.

My dear Enid,

Please tell your Mother I was ever so much surprised, and ever so much pleased, with her letter. And I hope ever so much that she'll bring you here to tea, some afternoon when you happen not to be in a passion: for it woud do to have screaming children in College: it would vex the Dean ever so much. I send you ever so much of my love. Get a hammer, and knock it ever so hard, till it comes in two, and then give Winnie half.

Yours ever so affectionately,
C. L. Dodgson.

Miss Enid Stevens.

Charles L. Dodgson (Lewis Carroll), like Thackeray, made a hobby of illustrating his letters. This charming note is taken from a collection of his letters entitled 'Letters of Lewis Carroll to His Child-Friends'. Apparently he and his little friend Enid have two jokes—one about her excessive use of "ever so much" and the other about her disposition.

letter addressed to another—even to a member of the family, except with permission—or read an opened letter which they find. They do not permit others to read a letter sent them, unless they are sure that the writer would not object. And, to show that they trust others to be equally well bred, they do not seal a letter which is to be delivered by a friend.

Good manners are as important in letter writing as in any other social activity. You want to present a good appearance in correspondence, as in your dress and your speech (*see Etiquette*).

Unruled paper, white or pale gray, blue, or buff, is in good taste for social letters. Fashions in the shape and design of letter paper change slightly from time to time, but paper of fantastic design should never be used. The paper you use for social letters may bear either your monogram or your address, but not both. Only paper for business letters may bear both the name and address.

Good form also requires that letters be written with blue or black ink, not with pencil; that margins be left at both sides and at the top and bottom of the page; that no abbreviations (such as A.M. and Tues.) and no figures be used in the body of the letter, for they give an impression of hastiness which is impolite. The date and the sender's address should never be omitted. The usual place for them is in the upper right-hand corner of the first sheet, but some put them at the end of the letter at the left-hand side of the page.

Salutation, Signature, and the Beginning of the Letter

In writing to a mere acquaintance or to someone you have not met, you would probably begin, "My dear Mrs. Sterling"; to a friend or a relative you would say less formally, "Dear John" or perhaps more intimately "Dearest Mary." The correct close for a letter which opens formally with "My dear Mrs. Sterling" is "Sincerely yours."

A more intimate letter may end with "Affectionately yours," "Lovingly yours," or with some other variation which appeals to you. Young people do not use

"Faithfully yours," and "Cordially yours" is not generally considered a desirable close. Whatever *-ly* word you use, *yours* should follow it. "Sincerely, John" is not grammatical and seems curt.

Except in letters to members of your family and to intimate friends, the proper signature is your first and last names, with a middle name or initial if you prefer. It is not necessary for an unmarried woman to put (Miss) before her name, and those of the best taste do not do it. A married woman signs her name this way:

Edith Wordsworth Prim
(Mrs. Barstow Prim)

or she omits her maiden surname if she chooses.

The start of a letter is important, just as first impressions are important in our contacts with people. Beginning with an apology such as, "I meant to write

you before, but I haven't had time," is uninteresting. It would be pleasanter to say, "I am glad today is a holiday, so that at last I have time to write you." There is nothing amiss in beginning with "I" when that seems natural, but a letter studded with I's appears too full of self. Turning a sentence around will

often make the I's less conspicuous. Instead of "I received your letter. I was glad to hear from you," you might say, "You were good to write me that jolly letter while I was ill."

Too few I's are nearly as bad as too many. Chopped-off sentences, such as "Was glad to get your letter" and "Hope you are better," are ungrammatical and abrupt as well.

Letters of Thanks and Informal Invitations

Among the special kinds of letters which must be written from time to time, letters of thanks come first. Writing these promptly shows one's appreciation and is certain to result in more enthusiastic letters.

Mr. and Mrs. Carl Swann Holt

request the honor of your presence

at the marriage of their daughter

Geraldine

to

Mr. Enoch Hoe Garden

Saturday, the tenth of June

at twelve o'clock

St. Mark's Church

Chicago

Invitation to Wedding Ceremony (¾ actual size)

Mr. and Mrs. Carl Swann Holt

request the pleasure of your company

at the wedding breakfast

at half after twelve o'clock

Sixteen Belmont Avenue

Invitation to Wedding Breakfast

To be gracious they should be specific. For example, instead of writing "Thank you for the present you sent me," mention the gift received and tell what you like about it. "Thank you for the book about stamps. It will help me to get my collection in order."

The "bread-and-butter letter" is the one sent to one's hostess after a visit. When you have spent a few days at the home of a chum, you write shortly after your return home not only to this friend but also to the mother of the household. Here is an example:

246 Wilmette Street
Malden, Michigan
July 10, 19—

Dear Mrs. Millmont:

Mother met me when I got off the train and wanted me to tell her at once about the good times I had at your house. It was fun just talking about them. I especially enjoyed the trip to Bald Mountain and the visit to the tile factory and swimming in the river every day. Thank you for all you did for me. Please remember me to Mr. Millmont.

Sincerely (or affectionately) yours,
Marion March

Before young people visit in one another's homes, it is customary for the mothers to exchange letters. But sometimes, when the families know each other well, a daughter may send an invitation in her mother's name.

Dear Lucia,

Mother wants me to ask you to spend the week of August fifth with us at the seashore. There is a good train which gets to Milford at four o'clock, and we could meet you there Monday afternoon. We'll swim, play tennis, and picnic on the beach. I do hope you can come.

Your loving
Emily

Although nowadays many invitations are given over the telephone, a note is sometimes preferred. A schoolgirl might write:

Dear Timothy,

Will you come to a Hallowe'en party at my house Saturday evening, October thirty-first, at eight o'clock? Come in costume and false face. I hope you can be with us.

Sincerely yours,
Lydia Waite

The response would be something like this:

Dear Lydia,

I'll be glad to come to your Hallowe'en party Saturday evening. I'll be in such a good disguise that even you won't know me.

Yours as ever,
Timothy Rule

Formal Invitations and Replies

Occasionally you will receive a formal invitation to a party or wedding, written or engraved in the third person. In this case your reply is also written

in the third person. An acceptance usually begins "Miss Brown is pleased to accept the kind invitation of" and then follows closely the wording of the invitation. By mentioning in your acceptance the date and place and also the hour stated in the invitation, you tell your hostess that you have carefully noted the time and place of the party. Use white note paper four by five inches in size. Never sign or date a formal reply. Invitations frequently have the letters "R. S. V. P." in the lower left-hand corner. They stand for *Répondez s'il vous plaît*, the French for "Reply, if you please." Again, the words "Please reply" may appear on the invitation, but the absence of these reminders does not release you from replying.

When you receive a wedding invitation asking you to the church ceremony only, you need not reply. But if the wedding is to be at home, or if you are invited to the wedding breakfast or reception after the ceremony, you must send an answer. Let us suppose you receive a wedding invitation and a card to the wedding breakfast, like those on the opposite page. You would answer the invitation to the breakfast only, as in the example below:

Miss Elaine Tennyson
accepts with pleasure
Mr. and Mrs. Carl Swann Holt's
kind invitation to the wedding breakfast
Saturday, the tenth of June
at half after twelve o'clock
at Sixteen Belmont Avenue

The reply to an invitation to a home wedding would begin in the same way, but the latter part could be shortened to

kind invitation
for Saturday, the tenth of June

A note of regret would be written like this:

Mr. Calvin Leighton
regrets that illness
prevents his accepting
Mr. and Mrs. Carl Swann Holt's
kind invitation
for Saturday, the tenth of June

It is not necessary to give the reason for declining an invitation, but it is more polite to do so. It might be "absence from town will prevent his accepting" or "a previous engagement prevents his accepting."

Hostesses who are very particular like to word their formal invitations entirely in the third person. Thus, instead of "request the honor of your presence," such an invitation will read:

request the honor of
Mr. Calvin Leighton's
presence

In an engraved invitation of this type a line is left blank and the name of the person invited is filled in by hand.

Invitations to informal dances or dinners or to teas are frequently written on visiting cards.

How to Write Business Letters

A business letter must above everything else be clear and to the point, but it cannot be effective

unless it sounds as natural as talk. Stilted expressions take all the life out of a letter. The roundabout "I beg to acknowledge your favor" and the formal close prevalent in Charles Lamb's time, "I am, Sir, with great respect, your humble servant" are equally out of fashion.

Unnecessary words and insincere phrases are also avoided by good letter writers. For example, "Enclosed is" or "I am enclosing" is preferable to "Enclosed herewith." "Your letter" or "your order" is simpler than "your esteemed favor." And "We are pleased to advise you" is both pompous and useless. Some of the rules for the format of social letters, such as leaving good margins and placing the letter so that it looks well on the page, apply to business letters as well, and should be carefully followed.

One of two endings will serve for nearly all business letters—"Sincerely yours" to one person, whether an acquaintance or a stranger, and "Very truly yours" to a firm. "Respectfully yours" is suitable in a letter to a person of high position in the church or government, and perhaps in a letter from a young employee to the company head, but not on other occasions.

In business letters it is important to include both the *heading* (the date and the address of the writer) and the *superscription* (the name and address of the person or the company to whom the letter is written).

Following the superscription, a letter to a firm may begin either with "Gentlemen" or with "Dear Sirs." Some think the latter more courteous, but "Gentlemen" is in common use.

Letters of Application

A good letter of application is straightforward, definite, and confident but not boastful. It should sound as if the writer were thinking of the employer's needs and not simply following a form.

2440 Logan Avenue
Atlanta, Ga.
June 18, 19—

Messrs. Gray and Herbert
Lawyers Building
Atlanta, Ga.

Dear Sirs:

Please consider me as an applicant for the position of office assistant which you advertised in today's *Times*.

I have just received my diploma from the West Side High School and am eager to get in an office like yours, since I am especially interested in law.

During the past two summers I worked as a messenger in the Charters National Bank and the Farmers State Bank and learned something about office practice and routine. I can use a typewriter and an adding machine and handle a switchboard.

For information about my character and ability, I can refer you to

Mr. Marshall Drury, Charters National Bank
Mr. E. P. Small, Farmers State Bank
Dr. Wiley Ash, St. Paul's Episcopal Church

I shall be glad to come to your office for an interview at any time you suggest. My telephone number is Hickory 5040.

Very truly yours,
Mark Spencer

In this letter the applicant gives in a few simple paragraphs his education, his interests, his experience—adding a detail or two about the specific things he can do that might be useful to an employer—and his references.

Inquiry and Order Letters

In a letter of inquiry the important thing is to give the information necessary for an answer but no more.

CENTRAL HIGH SCHOOL
GRANADA, ARKANSAS

November 25, 19—

Bombazine Costume Company
250 Forrest Place
Little Rock, Ark.

Gentlemen:

The senior class of Granada High School will present "The Rivals" on December 20. Can you supply us with suitable eighteenth-century costumes? What is the rental charge for costumes of this type?

Very truly yours,
Stephen Story

An order letter must be explicit.

45 Pembroke Road
Cleveland, Ohio
April 15, 19—

R. G. Watson Supply Company
1331 Chester Street
Philadelphia, Pa.

Dear Sirs:

Please send me the following items taken from your Spring Catalog Number 21:

4 baseballs, # 617, @ \$.25.....	\$1.00
7 baseball gloves, # 242, @ \$.85.....	5.95
	<u>\$6.95</u>

I enclose a money order for \$6.95.

Very truly yours,
Robert Swenson

The *block form* for the heading and the superscription (shown in the above letters) is preferred today to the *indented form*:

R. G. Watson Supply Company
1331 Chester Street
Philadelphia, Pa.

Punctuation is omitted at the end of lines, except when an abbreviation calls for a period. In business correspondence (but not in social letters) names of states may be abbreviated. It looks better never to abbreviate "street," "avenue," and similar words. The address on the envelope should look like these:

Mrs. Robert South	National Cracker Company
1245 Barren Street	400 West 42d Street
San Francisco, Calif.	New York City

When you write either to a person or to a company requesting a reply that is merely a favor to you, always enclose a stamped, addressed envelope. This is not needed when you inquire about an article that is for sale or apply for a position which has been advertised.

It is important to know how to write a good business letter, for almost all of us have such letters to write.

The 'Secretary's Handbook', by Taintor and Monro, is a helpful book of reference on business letters.

Books of Letters That You Will Enjoy

Besides the collections of letters already referred to in this article, there are many others that you will enjoy reading. Among them are: 'Selected Letters', Stella S. Center; 'A Book of Letters', Stella S. Center and Lillian Margaret Saul (letters written to or by young people); 'Children's Letters', Elizabeth Colson and Anne Gansevoort

Chittenden; 'Fifty Famous Letters of History', Curtis Gen-try; 'A Selection from the Letters of Lewis Carroll to His Child-Friends', C. L. Dodgson; 'Theodore Roosevelt's Letters to His Children', Joseph Bucklin Bishop; 'The Letters of Charles Dickens', Mamie Dickens and Georgina Hogarth; 'Mark Twain's Letters', Albert Bigelow Paine; 'The Paston Letters', James Gairdner; 'Nineteenth Century Letters', B. J. Rees; 'The Gentlest Art', Edward Verrall Lucas; 'Letters of a Woman Homesteader', Elinore Stewart; 'The Lost Art: Letters of Famous Women', Dorothy Van Doren.

The MEN who FIRST CROSSED the UNITED STATES

LEWIS AND CLARK EXPEDITION. When President Jefferson, in 1803, dispatched Captain Meriwether Lewis and William Clark to explore the land west of the Mississippi River, he was not obeying a

sudden impulse arising from the purchase of Louisiana in that year, but was carrying out a plan he had cherished since 1783.

Lewis parted from Jefferson at Washington within a few days after the receipt of the news from Paris announcing the Louisiana Purchase. But not until May 1804 did the party of explorers leave St.

"trio of pests—mosquitoes, eye gnats, and prickly pears—equal to any three curses that ever poor Egypt labored under."

In the last week of October, after ascending the Missouri River for 1,600 miles, they reached a village of the Mandan Indians near the present site of the city of Bismarck, N. D., and went into winter quarters. From there they sent back letters to President Jefferson, together with nine cages of living animals and birds, besides boxes containing specimens of rocks, plants, Indian dress, etc.

After five months spent at Fort Mandan the expedition started out again. Clark wrote that he "could not but esteem this moment of my departure as among the most happy of my life." Passing the mouth of the Yellowstone, the party continued up the main river until they came to the Great Falls of the Missouri, a veil of spray 80 feet high descending between lofty cliffs of solid rock. Their Indian guide showed them how to make wheels of cross-sections of the cottonwood, on which to carry the boats the 20 miles around the Falls.

From there on Bird Woman was the guide. They had passed the gate of the Rockies and were in a labyrinth of streams and passes. At the three forks of the Missouri—which the explorers named after the three statesmen, Jefferson, Madison, and Gallatin—they took the South Fork—the Shoshone trail. After a long journey, the tepees and grazing ponies in the Shoshone valley were a welcome sight.

Bird Woman also visited her brother in the Shoshone tribe. Then she, her husband and the explorers set out across the coast range to the Columbia and the Pacific. The explorers camped by the Pacific on Nov. 15, 1805, and Capt. Clark himself took Bird Woman and her husband to see the ocean on Jan. 7, 1806.



WILLIAM CLARK



MERIWETHER LEWIS

Louis on their 8,000-mile journey, which was to last two years and four months. The party consisted of about 30 persons besides the leaders. One of the guides was "Bird Woman," so called from her Indian name, Sacajawea (also spelled Sacagawea and Sakakawea). Her own tribe lived in Idaho, but she had been captured five years before and sold to her husband, who acted as an interpreter for the party. The leaders found her of great service in guiding them up the Missouri River and across the mountains to the Columbia, though "often her intellect appeared too dull to have comprehended what she saw during her descent of the Missouri." But this was not surprising, since no Indian could be expected to know the value of such explorations. (For route of the party, see United States, historical map.)

The leaders had expected to have difficulties with hostile Indians, but they wrote in their journal that they "experienced more difficulties from the navigation of the Missouri than dangers from the savages." These were due to its swift current, numerous snags, and caving banks, which threatened shipwreck to their frail canoes. Much of the time Lewis traveled on foot hunting, collecting specimens, and examining the country. Among their greatest troubles were the

There on the Pacific coast the party spent the winter of 1805-06. Lewis and Clark spent much of their time writing in their journals the accounts of what they saw, the Indians they met, and the customs of the strange tribes. The men were employed in hunting and preparing food, and in making clothes for the return trip, which was begun the last of March.

The Bird Woman and her husband returned across the mountains with them to the Mandan village, and were paid \$500 for their services, a sum sufficient to build them a good cabin and buy many ponies.

In Portland, Ore., Bismarck, N. D., and other places, are statues honoring Bird Woman. A Montana mountain pass, peak, and river also bear her name.

The explorers reached the Mississippi again in September 1806, and their reports excited the liveliest interest. The vast fertile plains, the lofty mountains and the beautiful valleys, and the mild climate of the Pacific coast fired the imagination; and soon settlers began to pour into the new regions.

The members of the exploring party were given honors and large grants of land. Lewis was appointed governor of the territory of Louisiana. He died in 1809. According to one account he committed suicide; others say he was murdered while on a journey. Captain Clark returned to the Army, and was appointed governor of the Northwest Territory and superintendent of Indian affairs. He died in 1838. Not until 1903 were the valuable journals of Lewis and Clark published in full and complete details given of this most remarkable expedition.

LEXINGTON AND CONCORD, BATTLE OF. The American Revolution began on Apr. 19, 1775, with the battle of Lexington and Concord. Some time before, General Gage, the military governor of Massachusetts, had received orders from England to arrest and send to England for trial two men, Samuel Adams and John Hancock, who were accused of stirring up rebellion in the colony. On the night of April 18 Gage sent a detachment of troops of 800 men to Lexington, where the "traitors" were staying. His orders to the troops were to arrest the two men, and then push on to Concord to destroy some military supplies stored there by the colonists. News of the expedition leaked out, and two of the "minutemen" (as the colonial militia were called), William Dawes and Paul Revere, rode through the country, warning

the inhabitants that the British regulars were coming. As a result, when the troops reached Lexington they found about 50 minutemen drawn up on the Lexington common, an open square in the center of the town.

Pitcairn, the British commander, ordered the rebels to disperse. When they refused, the British opened fire, killing eight and wounding ten. The others, being too few to fight, sullenly dispersed, and the British went on their way toward Concord. Hancock and Adams, warned of the coming, had already fled.

The soldiers arrived at Concord at seven o'clock that morning. During the night the colonists had hidden most of their stores and ammunition. Such as they had not been able to hide, the British set about destroying. While they were about this work, they met the minutemen at the old North Bridge over the Concord River, and fired upon them. The shots were answered by the Americans, and the war was begun. In this skirmish the British numbered about 200, the Americans, 400. The Americans soon poured over the bridge and the British retired.

After resting for a while, the British began their retreat to Boston about noon. Meantime, the embattled farmers had been gathering from far and near, and from behind rock, fence, and building they picked off the brightly clad soldiers as they hurried along the road. At Lexington, the fleeing redecoats were met by another detachment of 1,500 soldiers sent out by General Gage.

Thus strengthened they returned to Boston, having lost 274 killed and wounded, and 25 missing. The American loss was 83 killed and wounded.

Visitors to the town of Lexington, 12 miles northwest of Boston, may still see Monroe Tavern, which the British used as their headquarters; Buckman Tavern, which was the rendezvous of the Minutemen; and the Hancock-Clarke house, where Adams and Hancock lodged the night before the battle.

Concord also contains memorials of the struggle there. The most notable is Daniel Chester French's sculptured figure, 'The Minute Man', set on a granite pedestal on which are cut these words of Emerson:

By the rude bridge that arched the flood,
Their flag to April's breeze unfurled,
Here once the embattled farmers stood
And fired the shot heard round the world.

LIBERIA. This Negro republic on the west coast of Africa just north of the Equator is now the only remaining section of the "black man's continent" that is

"BIRD WOMAN"



This statue by Leonard Crunelle, at Bismarck, N.D., depicts Sacajawea with her son, John Baptist, looking toward the West she helped to explore.

completely independent. It is of special interest to Americans because it was founded as a refuge for liberated slaves from the United States. Its constitution and flag are modeled after those of the United States. Monrovia, its capital and chief port, is named after President James Monroe. It was founded in 1822 by the American Colonization Society as a home for free blacks, for whom there was then little place in the United States, either North or South. In 1847 it was formally proclaimed an independent republic.

Only about 12,000 of the estimated 2,000,000 inhabitants are descendants of American Negroes. These Americo-Liberians, who are civilized and Christian, share the coast and its vicinity with about 30,000 partly civilized natives. The other inhabitants are "bush" Negroes, living in the interior. These speak only their native tongues, and few have even heard English, the language of the government. Liberia is a little larger than Ohio, with an area of 43,000 square miles and a coast line of about 350 miles. Five-sixths of it is covered with forests, which grow dense and tall because of the fertile soil and the equatorial heat and rain. In 1926 a group of Americans leased a million acres for growing rubber and began plantations which now send thousands of tons annually to the United States. Palm nuts and oil, piassava fiber, coffee, and cocoa are also exported. Farming and mining are but little developed. Gold, diamonds, copper, zinc, and iron have been found. There are no railroads.

The United States has several times helped Liberia in its political and financial difficulties. Since 1926 American officials employed by the Liberian government have supervised the finances. In 1929 and 1930 the United States led an international move to stop the enslavement of natives by officials who forced natives to work without pay and to "pawn" women and children to their creditors. The Liberian government in 1936 began a program of reform that bears fruit today in greatly improved economic and social conditions.

LIBERTY, STATUE OF. The giant statue of 'Liberty Enlightening the World' has become the symbol of freedom to oppressed peoples everywhere. It stands on Bedloe's Island in New York Harbor, its uplifted torch guiding to the New World "the homeless, the tempest-tost" of the Old World. The statue was a gift from the people of France to the people of the United

States, commemorating the alliance of the two nations during the Revolutionary War.

Édouard de Laboulaye, a French historian, proposed in 1865 that his country present a suitable memorial to the United States on the 100th anniversary of the signing of the Declaration of Independence. The Franco-Prussian War intervened, but in 1874 a young Alsatian sculptor, Frédéric Auguste Bartholdi, was sent to New York to confer with American authorities. As he sailed into the harbor, Bartholdi envisioned a colossal Goddess of Liberty, standing at the gateway to the New World.

The Franco-American Union was formed to collect the necessary funds. The total cost of about one million francs was contributed in France by popular subscription. The people of the United States subscribed \$250,000 for the pedestal. The statue was dedicated Oct. 28, 1886. (See also Bartholdi, Frédéric Auguste.)

In her uplifted right hand the Goddess bears a torch which is lighted by an electric lighthouse lamp. In her left hand she holds the Tablet of Law bearing in Roman numerals the date July 4, 1776. A broken shackle lies at her feet. The star-shaped wall around the base is the wall of Fort Wood, built in 1808-11. In 1937 the fort was abandoned and work began on landscaping the entire island of 10.38 acres to provide a proper setting for the Goddess. The statue was made a national monument in 1924.

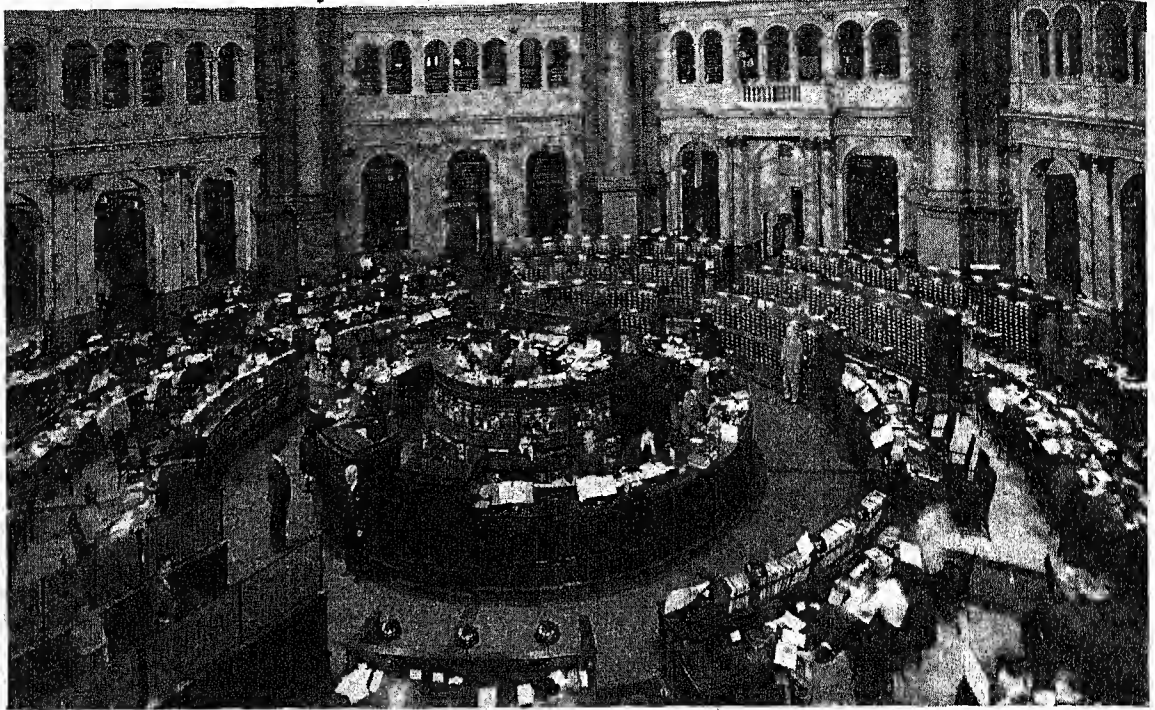
The figure is composed of more than 300 copper shells, 3/32 of an inch thick, supported by an iron framework designed by Gustave Eiffel, builder of the Eiffel Tower in Paris. Bartholdi first built a 9-foot model. This was enlarged to a figure 36 feet tall which was divided into sections. Each section was further enlarged to full size and patterns were made over

which the copper was hammered by hand. In the assembled statue each section of the shell was bolted to the central framework.

SYMBOL OF FREEDOM



The Statue of Liberty, nearly 152 feet tall, stands on a pedestal nearly 150 feet above the level of the water. Within the statue proper two spiral stairways of 168 steps each, one for ascending, the other for descending traffic, lead to an observation room beneath the spikes of the crown. This room is 260 feet above the harbor.

LIBRARIES *from* ANCIENT to MODERN TIMES

Main Reading Room of the Library of Congress, Washington, D. C.

LIBRARIES. From ancient times to our own day a golden thread of respect for books and the wisdom they contain has remained unbroken. Civilizations have perished, but books have somehow been preserved and libraries have continued to exist.

It was in western Asia and Egypt that men first learned to write and to make crude books. They wrote first on rolls of animal skins, clay tablets, and wood blocks, later on papyrus and parchment, and finally on paper (see *Books and Bookmaking; Paper; Papyrus Plant*). These books were laboriously made and carefully guarded. As their number grew, they were gathered into libraries in temples and palaces. Since only priests, scholars, and some kings and nobles could read, these early libraries served only a privileged few.

As the centuries passed, civilization was handed on from western Asia and Egypt to Greece, to Rome, to western Europe, and finally to the Americas. With civilization went the making of books and the creation of libraries. But always—almost down to our own day—libraries continued to serve only a privileged few. It is only a little more than a century ago that the free, tax-supported public library came into existence, dedicated to the larger purpose of serving all the people and encouraging the widest use of books.

Today the United States leads the world in its belief that free books should be available to all people, urban and rural, young and old, sick and well. To this end many experiments have been tried, and numerous services have been developed. England and other

countries have studied the American library system and have developed similar services. Canada has made notable progress in providing books for people in rural areas.

But, even today in the United States, complete library service is still far from universal. Only two-thirds of the people, it is estimated, have any access to free libraries, and only one-third of the people have good public libraries within easy reach. But the library pattern is set. Every year libraries grow and are improved. The day is coming when we shall have free books for all.

Libraries of the Ancient World

EXCAVATION of ancient cities in Egypt and Mesopotamia has uncovered some of the early temple and palace libraries. In the ruins of the Karnak Temple at Thebes archeologists found an inscription for a "House of Books." At Thebes they also discovered the tombs of two librarians named Miamun. These librarians were father and son, for the office was hereditary. At Idfu, 50 miles away, a well-preserved library building was uncovered which was known as "The House of Papyrus." A catalog cut into a stone wall of this building tells us that the library contained books on religion, hunting, astrology, astronomy, and many other subjects. When the earliest Egyptian libraries were established we do not know, but some of the great nobles probably had libraries in their palaces as early as 2000 B.C. during the Feudal Age.

Early Egyptians wrote mostly on papyrus sheets made from the papyrus plant which grew along the banks of the Nile. This material was very perishable, and hence only a few fragments from the vast collections of Egyptian libraries have survived to our day.

We know a little more about the temple and palace libraries of Babylonia and Assyria than we do about those of Egypt, for in western Asia the writing was done on clay tablets, which are less perishable than papyrus. In Babylonian libraries were works of grammar, poetry, history, science, and religion. Their keepers were called "men of the written tablets," and the first man known to have borne the title was a Babylonian named Amil Anu.

One of the most famous of the Assyrian libraries was at Nineveh. Though this library existed in the reign of Sargon II in the 8th century B.C., it is usually credited to his great-grandson Assurbanipal, who organized and enlarged it. About 22,000 clay tablets from this Assurbanipal library are now in the British Museum.

Greek and Alexandrian Libraries

More than any other ancient people, the Greeks loved learning, and by 500 B.C. reading was a common accomplishment with them. The following century saw the flowering of Greek genius in every department of literature, and scholars and men of wealth began to collect libraries of manuscript books. Plato and Aristotle had large collections. The Greek city states were the first governments to found and support public libraries.

The most famous library of the ancient world was founded in Alexandria near the close of the 4th century B.C. by the Greek ruler Ptolemy I. Later Ptolemies built up a collection which is said to have contained more than 700,000 manuscripts. The original library was a part of the great university known as the Museum, but, as the collection grew, a second smaller library was housed in the Serapeum, the Temple of Jupiter Serapis. Scholars from all over the world gathered at these "twin libraries" to study, and scribes came to copy manuscripts. The larger Museum library was partially burned in 47 B.C., when Julius Caesar's troops were fighting an Alexandrian mob; and about A.D. 391 the entire library was destroyed or scattered by order of Theodosius the Great.

The library at Pergamum in Asia Minor was a rival of the Alexandrian collection. Because this city was

so energetic in collecting books, Alexandria is said to have refused to sell it papyrus, thus forcing it to turn to the use of parchment. Other evidence of this active book-collecting policy is the story that the private library left by Aristotle was hidden in a cave to keep it from going to Pergamum. The Pergamum library of 200,000 manuscripts finally became a part of

the Alexandrian library. Mark Antony gave it to Queen Cleopatra to compensate for the destruction caused by Caesar.

Roman Collections

For five hundred years the Romans had no libraries, because they had no native literature. But as Roman generals returned from conquests they brought Greek books home as part of the spoils. Lucius Aemilius Paulus brought to Rome the library of King Perseus of Macedonia, and, when Sulla conquered Athens in 86 B.C., he brought the famous library of Aristotle. Caesar is said to have planned the establishment of public libraries in Rome, but he was assassinated before he had carried out his plan. Rome's first public library was founded about 37 B.C., during the reign of Augustus, by Asinius Pollio. Augustus established two other libraries.

The most famous Roman library was the Bibliotheca Ulpiana or Ulpian Library. This was founded by the Emperor

Trajan, who ruled A.D. 98-117. Early in the 4th century Rome had at least 28 public libraries. Most of these were in temples. When Constantine made Constantinople the capital of the Empire, he established there a library which survived for many centuries after the destruction of the libraries in Rome.

With the decline of Roman civilization, libraries began to perish from neglect. Their fate was finally sealed when Theodosius the Great closed the temples, and the libraries with them, in A.D. 392. The last of the ancient Roman libraries probably disappeared when Rome was pillaged by the Vandals. In spite of this destruction many manuscripts were hidden away and preserved until the time when medieval scribes copied and saved them for posterity.

The Middle Ages and the Renaissance

SOME of the early Christian churches had collections of books. The church at Alexandria is said to have had a library, and Tertullian (about A.D. 200) refers to it as possessing the Hebrew text as well as the Greek version of the Old

AN ASSYRIAN DICTIONARY



The Nineveh library, in the British Museum, contains a number of dictionary tablets like this, giving the Sumerian values and the Assyrian names and meanings of the cuneiform signs employed in writing.

Testament. Later the church at Jerusalem had a collection of books. Paulinus of Nola speaks of a *secretum* or reading room in the church at Nola.

But these collections were small, and the first important library development of the Christian church came through the establishment of libraries in monasteries. Each monastery library had a *scriptorium*, where manuscripts were copied by monks trained for

built up collections of books, many of which came from the monastic and cathedral libraries.

While the clergy of western Europe was thus preserving the Latin classics, the libraries of Constantinople and the monasteries of the East were performing the same service for the Greek classics. One of the important events which led to the Revival of Learning in the later Middle Ages was the emigration of Greek scholars from Constantinople, bringing to Italy the forgotten treasures of Greek learning.

Libraries and Collectors of the Renaissance

In the Renaissance period, kings, princely families, and churchmen vied in collecting books. In Italy the influence of Petrarch, Boccaccio, Poggio, and other scholars stimulated the search for classical literature, and many important manuscripts were discovered. The Este and Medici families were famous book collectors. About 1440 Cosimo de' Medici established a library in the cloisters of San Marco, which became the first public library of Italy. Later in the 15th century, Duke Federigo founded the Urbino Library, which was subsequently removed to the Vatican.

Among French book collectors of the 14th century, none were better known than the three sons of John II—Charles V, John,

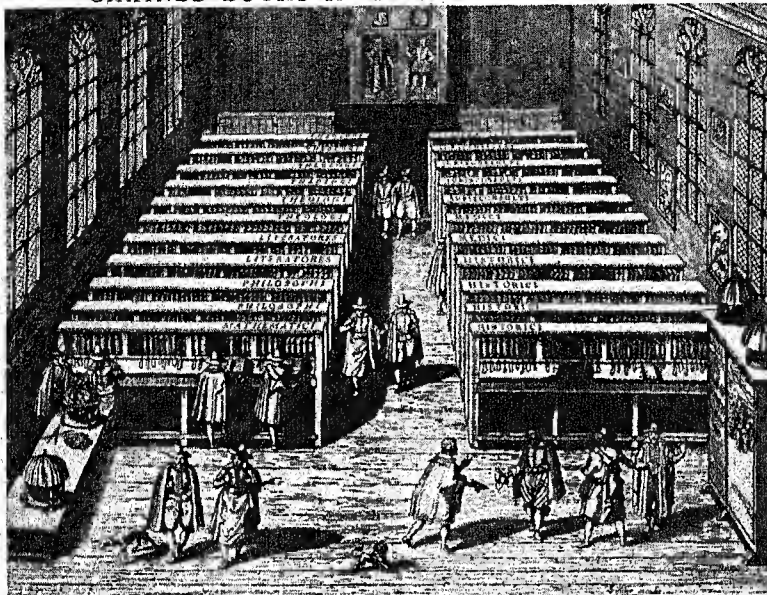
Duke of Berri, and Philip the Bold, Duke of Burgundy. In England the greatest book collector before the age of printing was Humphrey, Duke of Gloucester, who gave many books to Oxford University. His brother, Henry V, was also renowned for his interest in learning. Another brother, the Duke of Bedford, while regent of France, bought the library of Charles V and presumably brought it to England.

With the invention of printing in the 15th century the new interest in learning spread rapidly, books became cheaper and more numerous, and the development of modern libraries began. (See Renaissance.)

Libraries of Modern Europe

MANY OF the great national and university libraries of Europe had their origin in the private libraries of kings and great families. The Bibliothèque Nationale of France, the oldest of these, had its origin in the personal libraries of the kings of France. The library of Charles VIII (1470-98) is probably the nucleus of the present collection, which was enriched during the succeeding centuries by gifts and by plunder from conquered countries. Today the library has more than 4,500,000 books, as well as large collections of manuscripts, maps, music, and objects of art.

CHAINED BOOKS IN AN OLD DUTCH LIBRARY



To prevent theft, the old libraries used to chain the books to the cases. This view, from an old print, shows the famous library of the University of Leyden, which was founded in 1575 by William the Silent to reward the citizens of Leyden for their heroic resistance to the Spaniards the year before. It soon became one of the foremost universities of Europe.

the work. To the monasteries were brought books that had been saved when the ancient libraries were destroyed, and it is due to the patient work of the monks in copying the old manuscripts that so much classical literature has been preserved to our time.

One of the first scriptoria was established about 550 by the Roman noble Cassiodorus, in a monastery which he founded in southern Italy. Differing from some of the early churchmen in his appreciation of classical literature, Cassiodorus gathered a large collection of both classical and Christian books, and trained his colleagues in the art of copying manuscripts. Thus began the devotion to literary labors which was one of the traditional glories of Western monasticism, and especially of the Benedictine order.

Other religious orders which were active in collecting, copying, and translating manuscripts were the Augustinians, the Dominicans, and the Franciscans. Monastic libraries spread from Italy into England, Ireland, France, Spain, and other countries. (See Books and Bookmaking; Monks and Monasticism.)

As time went on, libraries were also established in cathedrals and a few large churches, some of which came to rival the monasteries as centers of learning and education. When universities arose, they too

The Mazarin Library in Paris, which was founded in 1643 by Cardinal Mazarin for public use, became a department of the Bibliothèque Nationale in 1930. The Arsenal Library, founded in the 18th century, and the Saint Geneviève Library, which dates from the 17th century, are now closely connected with the Bibliothèque Nationale; each receives a portion of the books deposited in the national library.

The British Isles

The British Museum in London, the national library of England, was founded in 1753, when the natural history and art collections of Sir Hans Sloane were willed to the nation. A few years later, the private library of George II and the Sloane, Harleian, and Cottonian libraries were united under the name of the British Museum and opened to the public. The library, which receives a copy of every book published in the kingdom, now has more than 4,450,000 books and manuscripts. Its old manuscripts, some of which date from the third century B.C., include early Greek, Hebrew, Latin, and Syriac writings as well as English historical records. Ireland, Scotland, and Wales also have national libraries.

To replace the earlier Oxford libraries which had been destroyed, Sir Thomas Bodley established the Bodleian Library in 1602. At his death, he left a trust fund to the library, which has since received many gifts. It has about 1,500,000 books and manuscripts. Especially notable are the Shakespearean collection, second only to that of the Folger Library in Washington, and the collection of biblical manuscripts. Since Bodley obtained the right to receive a copy of every book published in England, the Bodleian Library was regarded as the national library until the opening of the British Museum. (For picture, see Oxford.)

Cambridge University Library, which contains about a million volumes, has a continuous history from the 15th century. Like the Bodleian, it is entitled to copies of all books published in the country.

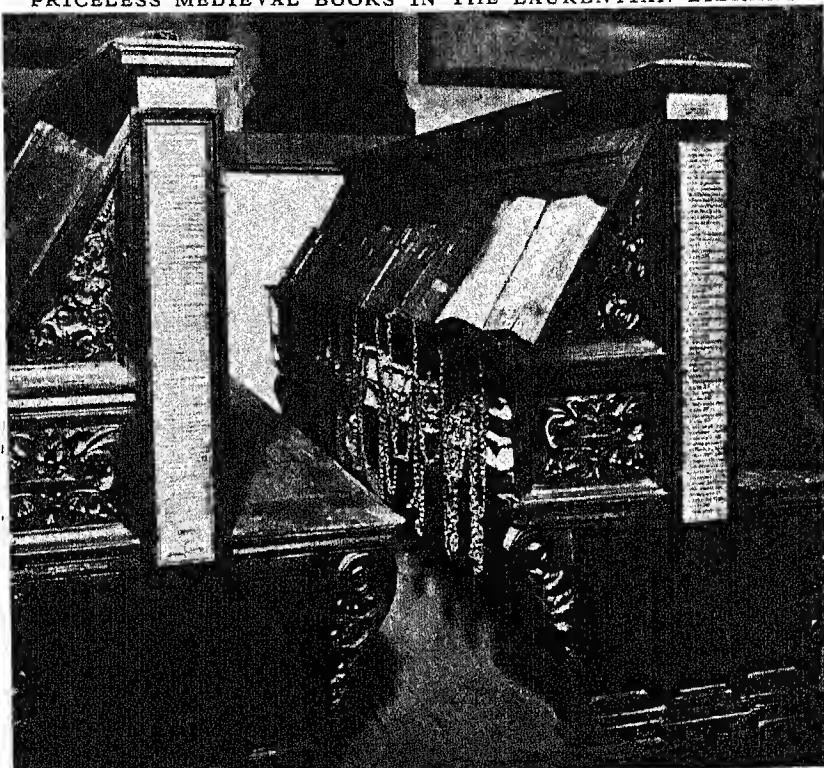
Great Italian Libraries

Although there were several preceding papal libraries, the present Vatican Library in Rome was founded by Nicholas V (pope 1447-55). Under Pius XI (pope

1922-39), former librarian of the Vatican, the library was reorganized and cataloged. This work was done under the supervision of Vatican and American librarians with the financial aid of the Carnegie Endowment for International Peace. In 1927 the disused papal stables were remodeled to form an addition. The Vatican Library has about 450,000 books, but it is most noted for its rare manuscripts, which number more than 60,000.

The Laurentian Library in Florence, which grew out of the collection begun in the 15th century by Cosimo de' Medici, contains some of the most valuable manuscripts in the world, including the most complete Vergilian manuscripts, the letters of Cicero, a hundred

PRICELESS MEDIEVAL BOOKS IN THE LAURENTIAN LIBRARY



Michelangelo designed the splendid building of the Laurentian Library in Florence, which was opened to the public in 1571. Though its collections include only about 20,000 printed books and manuscripts, many of the items are priceless because of their rarity and beauty. They represent the fruits of several generations of ardent book collecting in Renaissance days by the princely Medici family. Many of the volumes are still chained to the shelves.

manuscripts of Dante's 'Divine Comedy', and some beautiful illuminated manuscripts. The library is housed in a building designed by Michelangelo and is now supported by the state. In Florence is also the much larger National Central Library of Italy. This owes its origin to the collection of Magliabechi, who at his death in 1714 willed 30,000 volumes to the poor people of Florence. In 1861, under the Kingdom of Italy, it was nationalized. It contains about 2,500,000 books and is the chief center for Italian books.

The chief center for foreign books in Italy is the Vittorio Emanuele National Central Library of Rome.

founded in 1875 with books from religious houses which had been suppressed by law. There are also national libraries in Milan, Naples, Palermo, Turin, and Venice.

German and Danish Libraries

The Prussian State Library, originally called the Berlin Royal Library, serves as the national library of Germany. It was founded in 1661 by Frederick William, the Great Elector. Its more than 2,500,000 books and manuscripts include the largest collection of purely Germanic literature in the world. The Bavarian State Library in Munich, founded in the late 16th century, is noted for its outstanding collection of German, Greek, and Oriental manuscripts.

The Royal Library of Copenhagen is the largest of the Scandinavian libraries. Founded in 1665 by Frederick III, it now has about 950,000 books, including the world's finest collection of Icelandic literature.

National Libraries of Soviet Russia

The Leningrad National Public Library, formerly the Imperial Public Library, had its real beginnings under Catherine the Great (1729-96), who confiscated the library of the Zaluskis, a noble family of Poland. Since the Revolution of 1917, the Leningrad library has been greatly enlarged by the addition of the imperial and other large private libraries. It has the libraries of Voltaire and Diderot, an outstanding collection of documents pertaining to the French Revolution, and a manuscript collection second only to that of the Bibliothèque Nationale. The total number of volumes is said to be about 6,000,000.

The All-Union Lenin Public Library at Moscow is the center of library activities of the U.S.S.R.; it is reported to have more than 6,000,000 books and manuscripts. The original building, facing the Kremlin, is the palace of an 18th-century nobleman. This has recently been supplemented by a 16-story building. The library contains a collection of 2,000 ancient Chinese books, known as the Siku Tuan Shu Collection, which was the gift of the Chinese government. There is also a great national library at Kiev.

Wartime Devastation and Microfilming

Modern warfare has brought great destruction to libraries. The library of Louvain University in Belgium, destroyed by the Germans in the first World War and rebuilt by American funds, was again demolished in May 1940 in the second World War. The libraries of London suffered irreparable losses from German bombs; the number of books destroyed runs into the millions. Among the worst sufferers were the Guildhall Library, the British Museum, and University College. Many of the books and documents of English libraries were stored in bombproof vaults.

Before the second World War began, a project for photographing on microfilm the books and manuscripts of European libraries was started under the sponsorship of the Library of Congress and a committee from the American Council of Learned Societies. The project was financed by grants from the Carnegie and Rockefeller foundations. Outbreak of the

war stopped work, except in Great Britain and in the Vatican Library. These rolls of microfilm are stored in a building near the University of Michigan at Ann Arbor. By 1941 every book in the British Museum printed before 1550 was available on microfilm in the United States.

Popular Libraries in the British Isles

Circulating libraries for the use of the common people originated in the British Isles. The first town library was organized in 1608 by the city of Norwich. Early in the 18th century Rev. Dr. Thomas Bray, founder and secretary of the Society for the Propagation of the Gospel, established about 70 libraries in English parishes.

Subscription libraries for the well-to-do were organized as early as 1725. The Liverpool Lyceum, one of these early subscription libraries, is still in existence. Closely akin to subscription libraries were the early Mechanics' Institutes, which provided lectures and libraries for workmen. In 1817 Samuel Brown started traveling libraries for the rural people of Scotland. The service was originally free, but later it was put on a subscription basis.

In 1850 Parliament passed a bill permitting towns of 10,000 or more in England and Wales to establish public libraries, and in 1853 the act was extended to include Scotland and Ireland. These libraries were long handicapped by laws limiting the library tax rate to one penny in the pound. From 1918 to 1925 tax rates were liberalized, and laws were passed allowing county libraries to be established. In recent years British public libraries have greatly improved, and an excellent county library system has developed.

Up to 1917 many library buildings were erected in the British Isles through the generosity of Andrew Carnegie, who founded the Carnegie United Kingdom Trust. Grants from Carnegie Trust funds have stimulated the organization of county libraries.

Popular Libraries in Other Countries

In other European countries few popular libraries were organized until recent years. There has been considerable library progress in the Scandinavian countries and Finland. County libraries based on the American plan have been founded in Denmark and Sweden, and state aid is given to tax-supported public libraries in all four countries. In Russia popular libraries were unknown until the Soviet government came into power. Under the commissariats of education of the various republics, a system of regional, county, city, and village libraries has been organized. A popular movement for the extension of public libraries in most of the European countries was halted when the second World War began.

The Library Movement in the United States

THE LIBRARIES established in the United States during the colonial period and in the first years of the republic naturally followed the pattern which had been set in England. About 1700

GREAT LIBRARIES OF EUROPE

Dr. Thomas Bray, the founder of the first parish libraries in England, caused libraries to be sent to Maryland, New York, and other colonies. Some years later subscription libraries were organized. In 1731 Benjamin Franklin founded the Library Company of Philadelphia, a subscription library which still exists.

"At the time I established myself in Pennsylvania," writes Franklin in his 'Autobiography', "there was not a good bookseller's shop in any of the colonies to the southward of Boston. . . . And now I set on foot my first proposal of a public nature, that for a subscription library. . . . I drew up the proposals . . . and . . . procured 50 subscribers of forty shillings each to begin with, and ten shillings a year for fifty years. . . . This was the mother of all the North American subscription libraries, now so numerous."

Books from this library were loaned only to subscribers, but the librarian was instructed "to permit any civil gentlemen to peruse the books in the library room." Other well-known subscription libraries which still exist are the Boston Athenaeum and the Charleston Library Society.

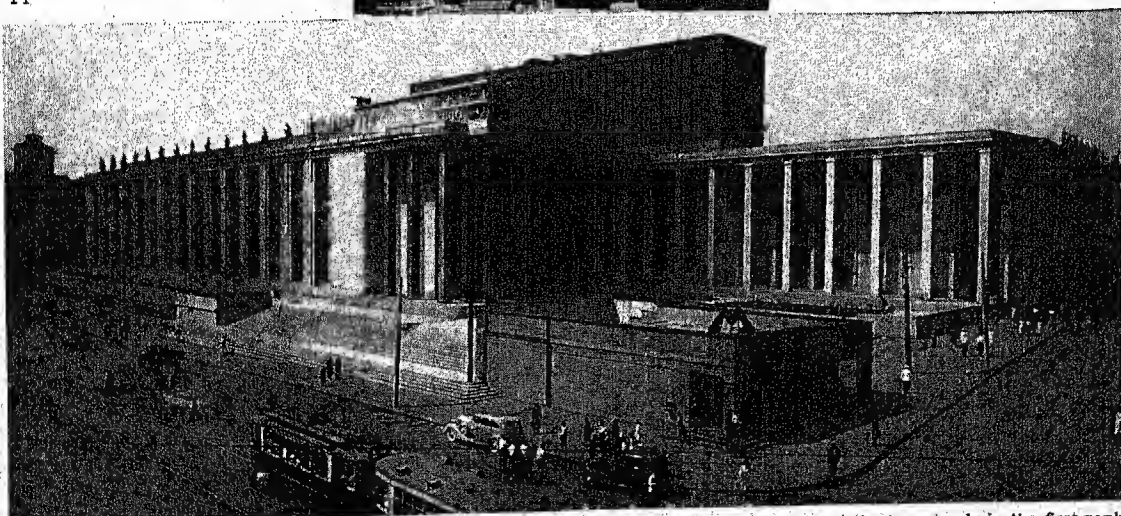
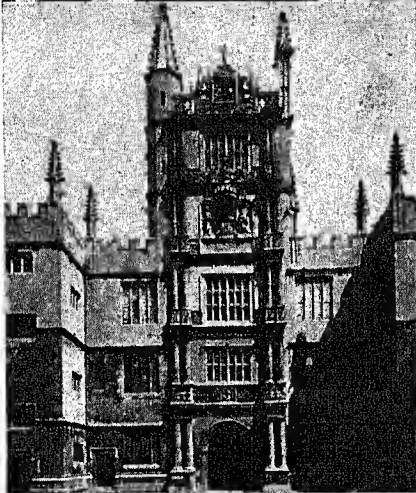
About 1820, mercantile and apprentice libraries were started

in New York and other large eastern cities for the employees of business houses.

Tax-Supported Libraries

The first library in the United States known to have received town support was at Salisbury, Conn. This had been started by a gift in 1803, and municipal support was voted in 1810. The public library at Peterborough, N. H., founded in 1833, is probably the oldest existing library which has had continuous tax support. New York, New Hampshire, and Massachusetts were the first states to pass laws permitting the establishment of tax-supported public libraries, and Boston was the first city to maintain a public library of any great importance. From these early beginnings, public libraries spread rapidly. Among the cities which established tax-supported public libraries before 1880 were Cincinnati, Cleveland, Detroit, Chicago, and Los Angeles.

Although these early public libraries did not give the service which makes the modern library so indispensable to its community, they were founded upon certain basic principles which explain the later popularity of the library movement. First of all, public libraries were never imposed upon the



In the richness of its manuscript collections, the Vatican Library, one gallery of which is shown at the top, stands in the first rank. The quaint 17th-century architecture of the Bodleian (center) at Oxford makes a striking contrast to the severely modern design of the new wing (1937) of the Lenin Public Library at Moscow. This building can house ten million books.

American people by the state or national government. They were organized by groups of citizens who cheerfully taxed themselves for library service because they wanted libraries. Even more significant is the democracy which has always characterized them. In the United States libraries were not planned for the exclusive use of the privileged classes, as in so many European countries, nor did they spring from a charitable desire to do something for the poor, as in England. They were established for the use of all the people, and they have grown to be essential to public education and recreation.

This democratic idea has prevailed also in those public libraries that have been partially supported by endowments. Such endowed libraries as the New York Public Library, the Enoch Pratt Free Library in Baltimore, and the Public Library of Providence, R. I., have functioned in exactly the same manner as have those libraries that have been maintained entirely through city taxation.

Modern Library Movement

The American public library movement took on real momentum about 1876, the year in which a hundred librarians met at the Philadelphia Centennial Exhibition and formed the American Library Association. These pioneer librarians were men and women of vision. They knew that the future of American libraries depended upon the ease with which people could use them. Melvil Dewey, one of the group who called the first conference, invented the Dewey Decimal classification system which made possible a simple and orderly book arrangement. Books were placed on open shelves, so that people could have direct access to them. Children's departments were opened. Library schools were founded to train librarians in new methods of service. State library departments were established. Librarians wrote and talked about libraries and the services which they could render to the people. The contagion spread. Men and women in cities, towns, and villages organized clubs or associations which had as their goal the organization or improvement of local public libraries. Organizations such as the General Federation of Women's Clubs supported the movement and worked for the advancement of libraries.

Interest in libraries received its greatest stimulus when in 1881 Andrew Carnegie began his gifts for the erection of free public libraries. By 1917, when gifts for library buildings were discontinued, he had given more than \$41,000,000 for 1,681 buildings in the United States. (See Carnegie, Andrew.)

Since 1920 popular interest in libraries has steadily increased. In many states there are organized groups of citizens who hold rallies and conferences to stimulate interest in better libraries. This citizens' movement started in North Carolina in 1927 with the organization of the North Carolina Citizens' Library Movement. Similar organizations have been formed in other states including New York, Ohio, Missouri, Louisiana, Kentucky, and several of the New England states. Through these organizations laymen, working

with librarians, have done effective work in promoting progressive legislation and state aid for libraries. These groups are also responsible for much of the development of rural library service in recent years.

The Modern Public Library

THERE ARE now about 6,000 public libraries in the United States. These libraries loan more than a half billion books in a single year, and countless people make use of their reference collections, reading rooms, and other departments.

In all the large cities there are excellent libraries with centrally located main buildings and numerous branches and stations. Modern library buildings are usually built on the street level. Some have window exhibits that vie with bookstore windows in attracting those who pass by.

The New York Public Library is the largest municipal public library in the world. It was founded in 1895 through the consolidation of the Astor, Tilden, and Lenox libraries and includes many famous book collections. The system has a main library building in the heart of New York's business section, 49 branches, and numerous substations. Book service to outlying areas is given through bookmobiles.

Special Services

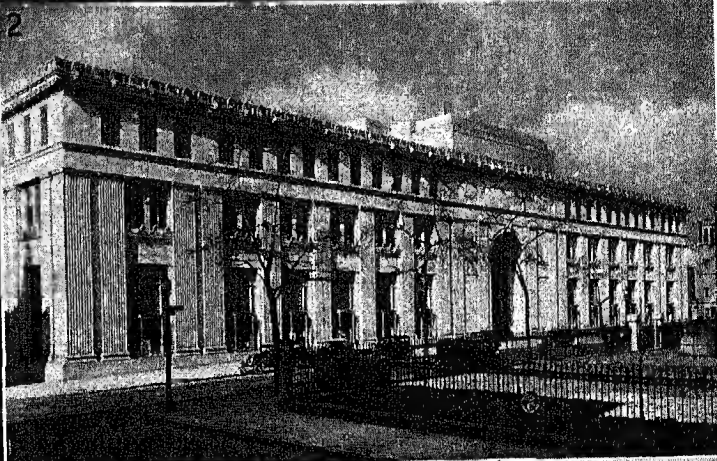
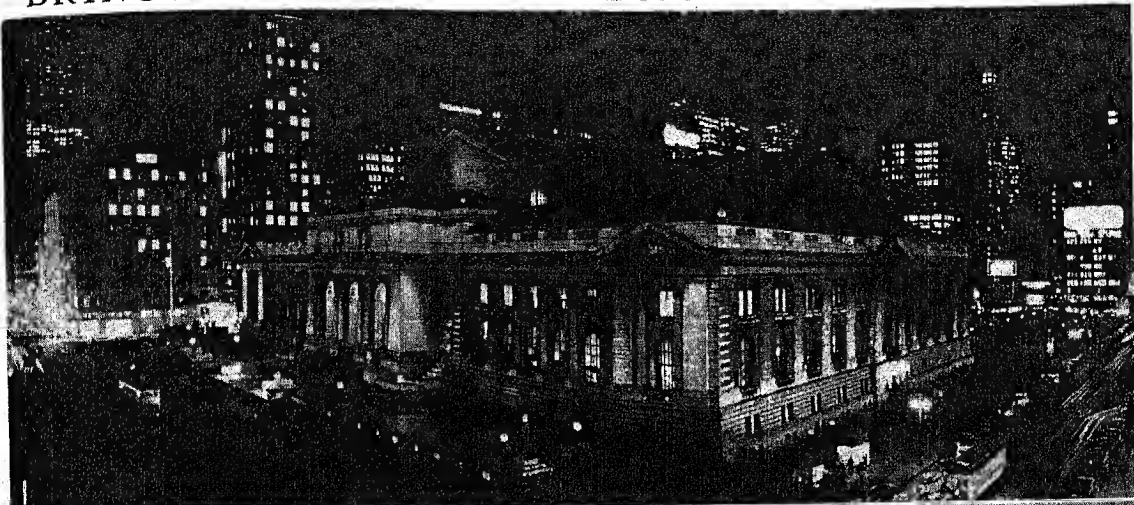
City libraries maintain many special services, such as branches or special collections for businessmen, technical departments for technicians and industrial workers, and music and picture collections. Readers' advisers give special aid to students and assist those who are not accustomed to using books. Collections of books in foreign languages are maintained for the use of students and for people of foreign birth who cannot read English. In many libraries books in braille or on phonograph records are loaned to the blind.

Some public libraries provide special service for hospitals. But the value of books in restoring health to those who are physically or mentally ill is so great that many hospitals have libraries of their own. The Federal government maintains libraries in government hospitals, and state hospital libraries are often financed and supervised through state library departments.

In 1940 the Chicago Public Library installed a small "curb service" library in a first floor corridor of its main building. Here borrowers select books from open shelves and have them charged without going to the main circulation desk of the library. Other city libraries maintain similar departments, which give the quick informal service usually identified with the small-town or neighborhood branch library.

Libraries in smaller cities and towns do not attempt all the services of large library systems, but they are often more closely integrated with the social life of their communities. In many towns the library is the meeting place for such groups as Boy and Girl Scouts, women's clubs, and various civic councils, and local librarians cooperate closely in the activ-

BRINGING BOOKS TO THE PEOPLE IN GREAT CITIES



The public library is one of the pillars of American democracy. Its aim is not only to preserve books but to encourage their widest use. Every citizen is made welcome in the splendid buildings of the large city libraries, such as the New York Public Library, the world's largest municipal public library (1). In newer buildings, such as the Enoch Pratt Free Library in Baltimore (2), inviting window displays on the ground level attract readers.

Special services are provided to meet the needs of everyone. Businessmen, for instance, find the answers to their current problems in the up-to-date pamphlets which form a large part of the modern library's resources (3). The Chicago Public Library's "curb service" provides quick service for busy patrons (4), and the Queens Borough Public Library of New York City carries books to the outlying parts of the borough in its book bus (5).

ities of such organizations. In all libraries, large and small, there is a trend toward a more personal service. Elaborate routine is avoided. Special needs of neighborhoods and individuals are studied, and buildings are made more attractive through the installation of modern lighting, comfortable chairs, tables, and other modern equipment.

Services for Children and Young People

One of the most important developments in the American public library is its services for children (see section on Children's Libraries). An outgrowth of the children's department is library service for young people, which bridges the gap between the children's and the adult departments of the library. Librarians in this field are concerned chiefly with the reading of boys and girls from 14 to 21 years of age. A recent survey shows that highly specialized service to young people is carried on in 22 cities, though guidance in reading is given to young people in most public libraries. The Cleveland Public Library created the first separate department for young people when it opened its Robert Louis Stevenson Room in 1925. Since that time most of the larger public libraries either have opened young people's departments or have made plans to do so as soon as space can be provided.

State Leadership and Rural Service

EACH OF the 48 states has some kind of state library. Some states have very large departments which are responsible for the preservation of state papers and records, and provide service to state legislatures, state hospitals, prisons, schools, and other institutions. Other states maintain several library departments which assume responsibility for some or all of these activities.

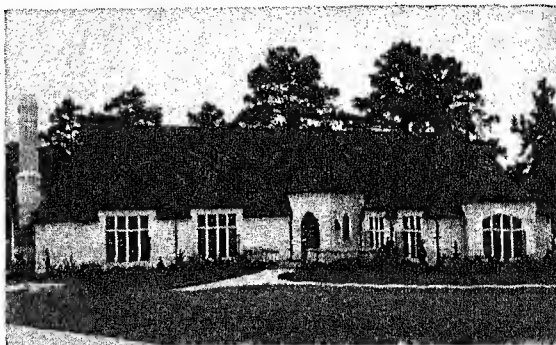
The states which have made the greatest progress in the organization of city and town libraries, and in rural library service, are those with library extension departments. In many states these extension agencies are independent departments, usually called "library commissions." In other states the library extension agency is established as a division of some larger department, such as the state library or the department of education.

In earlier years extension agencies encouraged the organization of independent village libraries and supplemented their meager book collections with loans. People living in very small villages or on farms were served through state book collections known as "traveling libraries." These collections were placed in post-offices, stores, or homes and were exchanged at fre-

quent intervals. Traveling libraries are still used extensively in many states, and there are hundreds of thousands of individuals whose main contact with books has come through some form of state loan. What these traveling libraries have meant to book-hungry people living in isolated sections is best learned from their own stories. One woman who had homesteaded in western South Dakota tells of walking five miles across snow-drifted fields to exchange books for herself and her children.

Shortly after the turn of the century, automobiles

INVITATION TO LEARNING IN A SMALL TOWN



The Kilgore Public Library (Texas), with its inviting approach and ground-level entrance, exemplifies the friendly appearance of the modern library in a small community. It is air conditioned.

and good roads began to shorten distances, and the idea that libraries should be located within easy driving distance of everyone became practicable. So the county rather than the town has come to be considered a logical unit for library support and administration. In some instances several counties have joined to provide library service, and some library systems are being developed in natural trade areas without regard for

county lines. A number of states appropriate special funds which are used to promote and partially support county or regional library service.

County Libraries

A county library is a library system built around a central library in some conveniently situated city or town, usually the county seat. Branch libraries and deposit stations are located in other towns in the county, and book collections are placed in schools. In many places extensive service is given through "bookmobiles," which are miniature libraries on wheels. These bookmobiles travel on a circuit and make regular stops at villages, at schools, and even at farm homes.

There are variations in the plan of county organization. Usually these libraries are entirely independent, although sometimes an existing city library serves one or more counties through a contract made with the county supervisors.

As far back as 1816 the Indiana constitution provided for the establishment of county libraries. None of the early libraries established under this law survived. The library law under which Indiana's system of county libraries now operates was passed in 1917.

The year 1898 is important in county library history because it marks the real beginning of county libraries. In that year was dedicated the Brumback Library, which was founded to give service to Van Wert County, Ohio. Also in 1898 legislation was passed in Ohio permitting the Cincinnati Public Library to extend its book service to all the people of Hamilton County. This same year a library was incorporated in Washington County, Md., and the legis-

lature of Maryland passed an act empowering Washington County to make an annual appropriation for the support of the library. In 1905 this Washington County library, operating from Hagerstown with Miss Mary Titcomb as librarian, began distributing books to rural readers with the first horse-drawn bookwagon.

Wisconsin, Oregon, Wyoming, and Minnesota are among other states which pioneered in the county library movement. By 1940, 40 states had laws permitting tax-supported county libraries, and reports compiled in 1940 showed county libraries organized in 38 states and in Hawaii. About one-seventh of the counties of the United States have county-wide library service. The story of county libraries in New Jersey, Ohio, North Carolina, or any of the states leading in the movement is interesting, but in California and Louisiana the growth of county libraries has been especially dramatic.

Progress in California and Louisiana

California has the greatest system of county libraries in the United States. By 1940, 48 county libraries had been established under a law passed in 1911, and only 10 of California's 58 counties were without service. The state library functions as a coordinating agency and clearinghouse. A union catalog at the state library aids in locating a needed book quickly, so that a library on citrus fruits in one part of the state, or one on the oil industry in another, may be of use to readers in other sections. In some counties bookmobiles supplement the service of branches and deposit stations. In most of California's counties school funds are pooled with county library funds, and rural schools have access to supplementary books, magazines, maps, pictures, films, and other materials.

In Louisiana spectacular progress has been made since 1925, when the American Library Association sponsored a demonstration of state-wide service. This project was financed with the aid of a Carnegie Corporation grant made through the League of Library

Commissions. Admittedly near the bottom of the list of states for its library service when the demonstration began, Louisiana today is outstanding for its accomplishments. An active library commission, working with funds appropriated by the state, has set up many library demonstrations in single parishes (counties) and in groups of parishes.

Before the days of parish libraries there were no libraries in Louisiana outside of the cities and larger

towns. Now books are carried to the people in some of the most isolated parishes. In Terrebonne Parish, for example, fishermen row across the bayou to the parish bookmobile which stops at regular intervals to bring them books. By 1940, nearly a fourth of the parishes had tax-supported libraries.

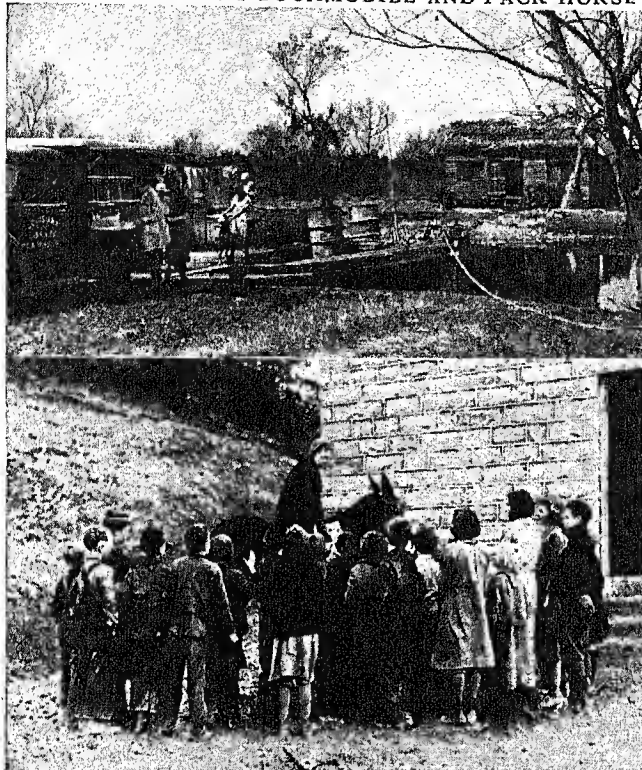
Regional Libraries

A regional library extends its service much as does a county library, but its area is not limited to any one political unit. Two or three counties may combine to form a regional library as in Louisiana and California, or a natural trade area may be used as a region for developing library service. In the area served by the Tennessee Valley Authority, regional library service has been financed

through both Federal and local funds. Canada has some interesting regional developments which are described later in this article.

Vermont has developed a particularly successful regional plan. In 1937 a bill was passed providing for state-supervised regional service. After a careful survey, the state was divided into four regions. Space for headquarters for each regional office was supplied by a cooperating library within the area. Each regional office has a headquarters staff, and a bookmobile delivers books on schedule to small libraries, stations, rural schools, and farm homes. Travel continues summer and winter, and only a hurricane or a blizzard interferes with the regular visits. Regional service is carried on under the supervision of the State Free Public Library Commission.

RURAL SERVICE BY BOOKMOBILE AND PACK HORSE



A Louisiana Library Commission bookmobile (above) makes a trip "down the bayou" bringing books to the shrimpers. This picture was taken in Terrebonne Parish, the southernmost and most rural of the Louisiana parishes. Below, children in an isolated mountain region of Kentucky eagerly welcome the arrival of books brought on horseback by a WPA librarian. Roads in this area are too poor to permit bookmobile service.

Children's Libraries—An American Achievement

children's libraries are amazing. They surprise and delight me. They are truly democratic. I should like to spend a long time in this beautiful room just reading in the company of the children. It is to become a child again—a child with a new freedom. Would I be permitted?"

A distinguished Danish author made this comment while visiting the children's room of the New York Public Library a few months after the opening of the central building in 1911.



She finds her own books

The opening of this room was significant as marking recognition by one of the world's great libraries of the wider national and international service that the children's library could perform. Here visitors from all parts of the world, who were flocking to the United States in the years preceding the first World War, found liberal provision of the best children's books in many languages. They also found a librarian interpreter who was familiar with foreign countries as well as foreign languages. In other leading libraries of the United States, they were similarly astonished and

delighted by the sight of children of all ages and many races making their own choice of books and reading side by side.

Forerunners of Children's Libraries

A strong tradition of genuine interest in children's reading preceded the organization of children's libraries in the United States. In fact, it preceded the whole free library movement, finding partial expression in school library collections, Sunday School libraries, libraries in social settlements, and children's magazines.

About the time of the organization of the American Library Association (1876) library leaders began to be concerned, because plans for the development of public libraries provided only for the needs of adults.

Dr. W. F. Poole, librarian of the Chicago Public Library, expressed his interest in service for children at a meeting of British librarians held in London in 1877. He said: "I could never see the propriety of excluding young people from a library

"I WAS prepared for everything else I have seen in America, but these

any more than from a church. From 10 to 14 years is the formative period of their lives." Sir Redmond Barry, librarian of the Melbourne Public Library, was even stronger in his views on the question of an age limit, for he said, "If it were necessary to deprive people of seven years of reading, it would be better to strike off the seven years at the other end and disqualify them at 63."

The First Children's Libraries

An interesting record exists of the establishment of a "juvenile library" in West Cambridge, Mass., in 1835. Dr. Ebenezer Learned left \$100 for children's books which were to be selected by the selectmen, ministers, and physicians of the town. This collection was absorbed by the Arlington Public Library when the town of West Cambridge became Arlington and bore no continuing relation to the development of library work with children.

The first room set aside for the use of children as a reading room was in the Brookline Public Library. The Minneapolis Public Library in 1893 established a children's department from which books circulated. In 1894 the Cambridge Public Library opened a reading room and the Denver Public Library opened a children's room with no age limit. In 1895 Boston, Omaha, Seattle, and San Francisco opened circulating libraries and reading rooms for children; and in 1896 Detroit, Buffalo, Pittsburgh, Everett (Mass.), Kalamazoo (Mich.), and Pratt Institute of Brooklyn followed.

The first children's room included in an architect's plan was that of the Pratt Institute Free Library of Brooklyn, opened in 1896. This children's room was designed by Mary W. Plummer, the director, and was provided with the first tables and chairs designed by a specialist in hygiene. From 1896 on, children's rooms were included in the plans of new libraries.

STORY HOUR IN A CLEVELAND LIBRARY



These children's faces show how forcefully the old tales strike home when told by a master of the ancient art, to which libraries have given new life.

CHILDREN'S ROOM IN THE BROOKLYN PUBLIC LIBRARY



Many children live in the neighborhood of Brooklyn's beautiful new main library. When this room was opened to the children in 1941, they crowded in so enthusiastically that it became one of the library's busiest departments. The lighting and other equipment for this children's room meet the highest modern standards.

Children's rooms were no sooner established than the need of special training for children's librarians became evident. The Library School of Pratt Institute offered such a course for two years (1898-1900). With the establishment of the Training School for Children's Librarians at the Carnegie Library of Pittsburgh in 1900 these courses at Pratt were discontinued. From these, and from the other library schools established later, leaders have gone out to many cities of the United States and Canada. All leaders in children's work unite on the same general objectives for a children's library. These include voluntary attendance, no age limit, respect for public property, collections of the best children's books, and the selection of librarians with a thorough knowledge of books and the ability to communicate to children a love for reading.

Children's Departments

With the rapid expansion of branch library systems in major cities between 1900 and 1920, children's rooms were organized into departments. These children's departments accounted for a third or more of the entire book circulation in the libraries where they were established. Before the days of children's departments, cooperation with public schools had been effectively carried on for many years by many public libraries and by state library commissions.

When the great cities began to provide playgrounds and to build

well-equipped fieldhouses, a new opportunity for library service opened up. Henry E. Legler, then librarian of the Chicago Public Library, was one of those who saw the part the library could play by establishing reading rooms and delivery stations in these fieldhouses. Story-telling was given its place in this civic extension of library service, not only in Chicago but in similar centers in Pittsburgh, Boston, New York, Cleveland, and other cities (see Story-Telling). The Cleveland Public Library, under the direction of William H. Brett and Linda A. Eastman, fostered reading clubs for young people and began active cooperation with the

Cleveland Museum of Art. The Free Public Library of Newark, under John Cotton Dana, related libraries to museums in new and interesting ways.

Every city, town, or village has its own individuality. Its citizens cannot be standardized or regimented in relation to their library, which should be a part of their inheritance from childhood. Therein lies the great opportunity of the children's room of the free public library. It is not merely a place in which to read and to obtain books. It is a place for the practise of first lessons in citizenship, consideration for others, care of public property, and independent thought and judgment. Consequently every

THE CHILDREN'S LIBRARY AT PALO ALTO



This attractive building, opened in 1940 for the sole use of boys and girls, was designed and built for its location, forming a unit with other buildings of a community center though it is a separate structure. Such special children's library buildings are still few.

city or community presents variations in requirements and possibilities for more active civic service on the part of the public library.

Special Buildings for Boys and Girls

A building for the use of children had long been the dream of many a librarian. It was first realized in 1914, when the Brownsville Children's Library, a large branch of the Brooklyn Public Library, was opened in one of the most congested foreign neighborhoods. The first such library in Canada was opened nine years later, in 1923, when the Toronto Public Library converted a dwelling near the Central Library into the Boys and Girls House.

Such separate libraries for boys and girls are still few. New York City has the Nathan Straus Branch Library for Children and Young People, opened in 1941. This is an Arabian-Nights transformation of the first station for pasteurized milk in New York City.

At Westbury, Long Island, is the Robert Bacon Memorial Children's Library (1924). This is a creative expression of the children's library idea in a rural setting, distinguished for architectural design, interior decoration and equipment, and the variety and rarity of its book collections. At Newton, Mass., the Boys and Girls Library (1934), a branch of the Newton Public Library, is housed in a converted dwelling surrounded by spacious lawns and a lovely garden. The Boys and Girls Library (1929) at Kenosha, Wis., is in a church which was successfully remodeled for the purpose. The attractive Children's Library of Palo Alto, Calif., opened in 1940, was designed to form a unit with the other buildings of a community center.

Children's Libraries Abroad

The children's library idea found early and strong support in Norway and Sweden and other countries of Europe. On her return to Sweden in 1907 after a tour of typical American libraries, Dr. Valfrid Palmgren raised the necessary funds to make possible the Children's Library of Stockholm, which opened in 1911. This was the first European adaptation of the American idea and ideal of library service to children.

American children's librarians who assisted in the work of reconstruction in France, after 1920, left convincing demonstrations in the municipal libraries of Soissons and Paris. In the American Library in Paris a children's room with a representative collection of children's books in English was maintained for several years. In Brussels and Paris children's libraries under the name of *L'Heure Joyeuse* were equipped by Americans with assurance of maintenance by the municipalities.

In London, in 1920, a children's library was created in the old house where Charles Dickens had lived. A staff of boys and girls administered the library under the direction of the young American clergyman who had discovered this "Tiny Tim of a house," little changed since Dickens' time, and had seen in it a children's library of unique possibilities. The house has since been torn down, but the influence of David

Copperfield's Library as a creative idea has been felt in Australia and in the United States.

Raising the Standards of Children's Books

The achievement of children's librarians in getting larger numbers of good books written, illustrated, and published is unique. One of the first discoveries made by children's librarians was that the supply of books to gratify the spontaneous interests of growing boys and girls was far too limited in variety and in quality. Progressive publishers responded readily to their appeals for new titles, reprints of books long out of print, translations from other languages, better typography, stronger binding, and more attractive format. This led to the organization within publishing houses of special departments charged with the making of children's books.

A children's library is or should be a place where a child or a grown-up discovers that literature is still going on, that any day a new poet, a new story writer, a new scientist, a new explorer, a new historian, a new creator of picture books may appear to claim attention and challenge interest. This contact with ideas wherever children are exposed to books in a natural way is not dependent on costly equipment or spacious new buildings. It rests upon the quality of the books chosen and the ability of the librarian to offer that natural exposure to recreational reading and to independent research that is akin to sunlight, fresh air, and physical exercise. (See also *Literature for Children*.)

School Libraries— Their Rôle in Modern Education

THE MODERN school library well illustrates the difference between the old conception of education and the new. The older type of school was built around the teacher and the textbook, and the library—if there was a library—was usually a drab place where reading was in no sense made attractive. Today's school library is in harmony with a school system which centers around boys and girls. Pupils are encouraged to get their information from a wide range of books which the school library provides in handsome editions temptingly displayed. Hobbies are encouraged, and so books are offered on such subjects as baseball, stamp collecting, and photography. Pictures and other visual aids are available, and often phonograph records and even museum specimens are provided.

The modern school librarian is as well trained for her work as the modern teacher. She keeps continuous contact with teachers and classes. She discovers the reading ability of those who use her library and studies their personal interests. To foster a love of reading on the part of boys and girls is as much her objective as to find material for classroom assignments.

The central library is usually the most inviting room in the school building. Comfortable tables and chairs, adequate lighting, attractive bulletin boards are essential features. From all parts of the school,

pupils, teachers, committees, and classes come to the library to read and work. Nor is the school library confined to one room. Just as the classroom is a part of the library, so the library becomes a part of the classroom. Special science collections are loaned to the science teacher. Near the desk of the history teacher is placed a group of books which fit in with the day's discussion. Books are emphasized in every phase of the school program.

This is the ideal toward which American schools are striving. But many schools in towns and villages are almost entirely without libraries, and, even in some cities, there are schools whose libraries are still inadequate. In the still numerous one-room rural schools, libraries are usually very meager unless the schools are so fortunate as to lie in areas which have good county or regional libraries.

Control and Organization

School libraries are organized in various ways. In some places, the local school authorities are entirely responsible for library establishment and control. In others, school libraries are developed under the joint control of the school administrators and the public library. Many large cities employ supervisors who have general oversight of all school libraries.

Appropriations adequate to the support of school libraries are hard to estimate. The Southern Association of Colleges and Secondary Schools makes the standard appropriation \$1.00 per student per year for books, periodicals, and other expenses, exclusive of salaries, for schools with enrollments of 500 or less. For enrollments of more than 500 the standard is \$.75. In a recent year Los Angeles spent \$1.32 per pupil in junior and senior high schools, and \$.64 per pupil in elementary schools for library books, exclusive of textbooks.

Steps in School Library Progress

New York was the first state to pass legislation providing for school libraries. It was soon followed

by Massachusetts and Michigan. Before 1900 there was much discussion of the need of school libraries and a few school libraries were established, but the school library as we know it today has developed in this century. The greatest progress has been made

since 1930. Central libraries have developed much more rapidly in high schools than in elementary schools. In New York State, for instance, in a recent year, 1,089 trained librarians were employed in the secondary schools, but only 74 were employed exclusively for elementary schools. There are several reasons for this. The high school has naturally followed the college pattern, and libraries have always been an indispensable part of a college. The organization of high school libraries has

also been stimulated through the requirements of six of the regional associations which accredit high schools and colleges. Of these, the North Central Association of Colleges and Secondary Schools pioneered in including definite requirements for libraries. The Southern Association of Colleges and Secondary Schools gave

great impetus to the development of high school libraries in Southern states when it adopted its present library standards, effective since 1939.

In elementary schools, classroom libraries under the supervision of teachers function successfully. Central libraries in elementary schools are steadily increasing in number.

Through the School Libraries Section of the American Library Association, formed in 1915, school librarians have

worked for more and better school libraries. In 1920 the National Education Association and the American Library Association set up official standards for high school libraries, and five years later the two associations approved elementary school library standards. In 1936 the School and Children's Library Division was established at the American Library Association headquarters in Chicago, and in 1938, when the Library Service Division was created in the federal

IN A PHILADELPHIA SCHOOL LIBRARY



The most attractive room in the modern school is usually the library, and pupils are encouraged to use it for both recreational reading and work. Modern methods of instruction require them to get their information from a wide range of books and magazines rather than from the textbook alone. This picture was taken in the library of the Logan School, Philadelphia.

USING THE DICTIONARY



Dictionaries and encyclopedias are among the most used tools in the school library. Here Newark high school students collaborate on a class assignment.

Office of Education, the promotion and development of school libraries became a governmental function.

State Promotion of School Libraries

Many states are taking effective action to develop good school libraries. About two-thirds of them provide for certification of school librarians and about a quarter provide school library supervisors. Many give direct financial aid. In states which make direct appropriations for books a ruling is often made that state money can be used only for titles selected from an approved state list. Some states do not prepare their own lists but adopt standard lists such as the 'Children's Catalog' and the 'Standard Catalog for High School Libraries', which are compiled through the cooperative work of librarians.

Boys and Girls Participate

The spirit which pervades a school library is just as important as trained service, adequate book collections, and proper equipment. Wherever you find a successful library, you find boys and girls who eagerly participate in making the library interesting and attractive. You find them writing about the library in their school papers, reviewing library books over the radio, forming library clubs. They often assist in the actual work of the library, preparing books for the

STUDENTS HELP IN A LOS ANGELES HIGH SCHOOL LIBRARY



Coöperation is the motto in many successful school libraries. Here a student charges books at a loan desk. Others return books to the library shelves.

shelves, helping their fellow students with difficult reference problems, and mounting clippings and pictures.

College and University Libraries—Other Great Research Libraries

MANY of the large public and university libraries of the United States are rich in research facilities. There are also a number of great research libraries which are famous for collections in special fields.

"The true university of these days is a collection of books," said Carlyle. One of the most significant yardsticks for rating a college or university is the

size of its library. The approximately 1,500 colleges and universities of the United States today have well over 60 million volumes. Compare this with the total of about 80,000 volumes in all libraries of all types in the year 1800.

Harvard University library with its 4,000,000 books and pamphlets is the greatest university library in the United States. It is also the oldest library in the country, created in 1638 when John Harvard gave his books to the university, which had been founded two years before. William and Mary College, founded in 1693, had a library from the beginning, as did Yale University (1701).

College and university libraries are notable not only for their book collections but also for their extensive use of new photographic methods to increase their resources and their services. Through the use of photostatic processes exact copies of pages in a rare book can be made available to students in any part of the world. Microfilming reduces an entire volume or a weighty newspaper to a light roll of film, which may be shipped in a container about the size of a sardine can.

The greatest Shakespearean library in the world is the Folger Shakespeare Library in Washington, D. C., opened in 1932. It contains more than 90,000 books and pamphlets and many thousands of manuscripts. Other rare items include paintings, play bills, photographs, and stage properties. (See Shakespeare.)

The Henry E. Huntington Library in San Marino, Calif., which was opened in 1920, is especially famous for its materials on the history and literature of North America and the British Isles. The library contains a valuable Shakespearean collection and such interesting items as the manuscript of Benjamin Franklin's 'Autobiography', and manuscripts of poems by Burns, Poe, and Kipling.

Chicago has two famous research libraries. The John Crerar Library, founded in 1894, specializes in technology and natural sciences. The Newberry Library (1887) specializes in literature, religion, philosophy, philology, fine arts, and typography. In

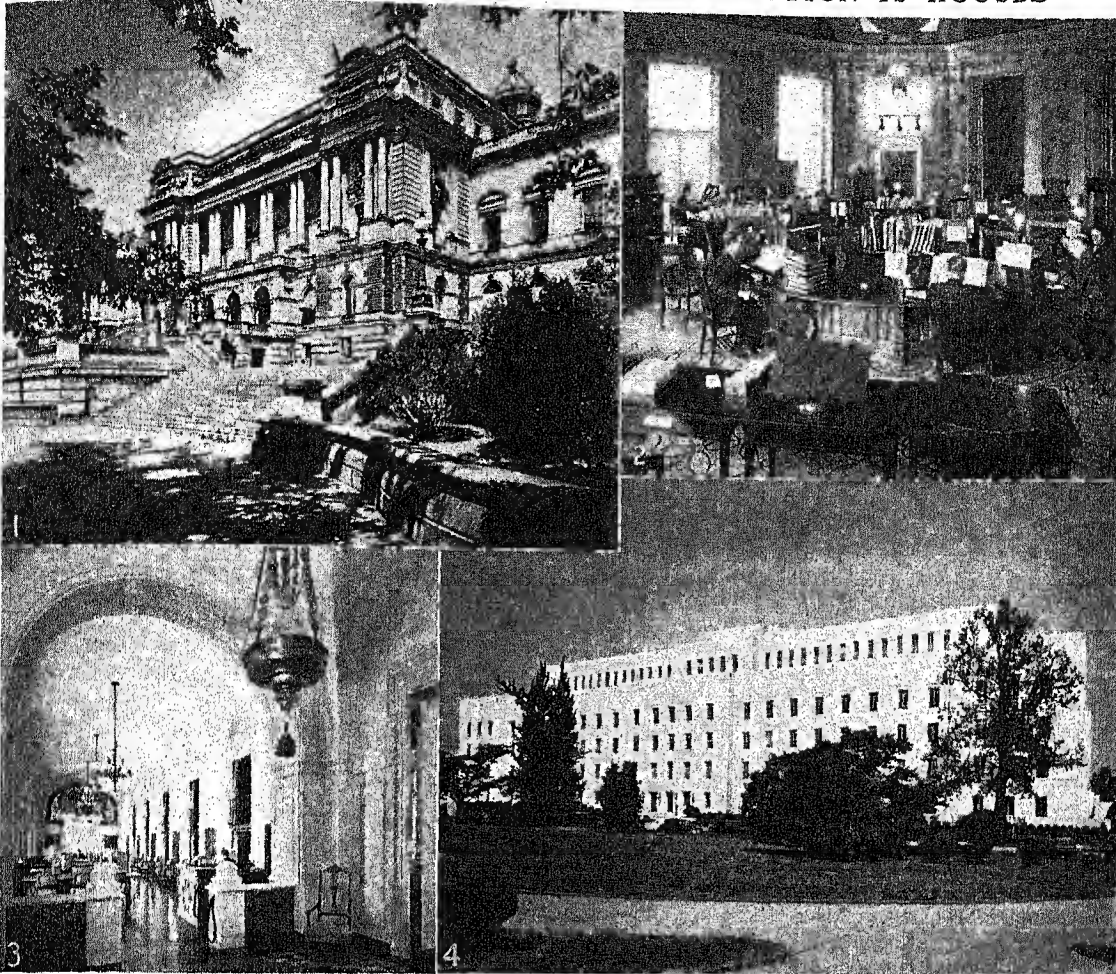
1911 it acquired the large Edward E. Ayer collection which deals chiefly with the American Indian.

The Pierpont Morgan Library in New York (1924) is notable for its medieval illuminated manuscripts, rare bindings, and first editions.

Libraries of the United States Government

One of the greatest of national libraries is the Library of Congress at Washington, which was established in 1800. The original building was burned in 1814 when British soldiers occupied the capital. The library was re-established with the purchase, in 1815, of Thomas Jefferson's library. The main building was erected in 1897 and the magnificent new annex

WHERE AMERICA'S GREATEST BOOK COLLECTION IS HOUSED



The Library of Congress in Washington, D.C., is one of the world's largest libraries. It occupies two buildings opposite the United States Capitol with nearly 36 acres of floor space and more than 400 miles of bookshelves. It has room for 15 million volumes. The two buildings cost nearly 19 million dollars. The views above show (1) the Main Building, completed in 1897; (2) the Manuscript Division, in the Main Building; (3) the Hispanic Room, opened in the Annex in 1939; (4) the Annex, completed in 1938.

in 1938. The Library of Congress contains more than 6,000,000 books and pamphlets, about 1,400,000 maps and charts, and millions of manuscripts. Every field of learning is well represented, but the library is especially strong in United States and Hispano-American history, music, and aeronautics. The law library alone includes a half million volumes. The collection of Chinese and Japanese books is not equaled outside of China and Japan.

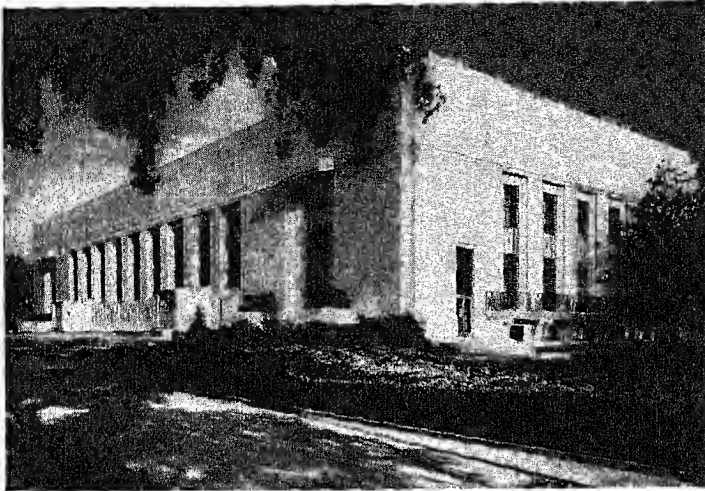
To serve the blind, the Library of Congress has a large collection of embossed books and phonograph book records. These are loaned through its own services and through 26 libraries which serve as distributing centers. Such books and records are carried post free by the Postoffice.

Since 1870 the registration of copyrights has been under the Librarian of Congress. The Register of Copyrights receives copies of all publications copyrighted in the United States, and these ordinarily become part of the library collections.

Washington has many other libraries, which make this city one of the world's greatest research centers. Government records are housed in the stately National Archives, completed in 1937. Many of the departments of the United States government maintain libraries. Among the most important departmental libraries are those of the Department of Agriculture and the Office of Education. In 1937 a Library Service Division was established under the Office of Education. Its purpose is "to gather facts and to undertake practical research in the field of librarianship," and "to assist by publications and consultative services in extending and improving library service."

From an office in the Navy Department building a librarian directs the work of maintaining libraries on the ships, hospitals, and shore stations of the Navy. Fresh libraries are placed on every new and reconditioned ship, and the recent expansion of the Navy has greatly enlarged the Navy library program.

THE WORLD'S GREATEST SHAKESPEARE LIBRARY



One of the special collections that unite to make Washington the world's leading center for research is the Folger Shakespeare Library. The beautiful building of Georgia marble contains an Elizabethan theater seating 260 persons.

For the expanding Army, a great system of camp libraries has been developed. This system is administered from Washington, with trained supervision in the corps areas and librarians in individual camp libraries. The District of Columbia maintains a fine library system for readers living in the district.

**Librarianship
as a Vocation—
Organizations
and Periodicals**

FIFTY YEARS ago, the chief requirements for a librarian were a good general education, knowledge of books, and an interest in working with people. Today these qualities are still essential, but special library training is also required.

The young person who is interested in entering the library field should find out what schools are accredited by the Board of Education for Librarianship of the American Library Association, since these schools give the necessary preparation for work anywhere in the United States and Canada. In addition to these generally accredited schools, there are other library schools which equip students for library positions in the states and cities in which they are located. Information concerning library schools and required preliminary courses may be obtained from directors of library schools, state library commissions, local libraries, or from the American Library Association, 520 North Michigan Avenue, Chicago.

Most accredited library schools are in colleges and universities and give one or two years of specialized training. For admission they usually require four years of college work, though a few require less preliminary education. As a rule

they accept only applicants between 20 and 35 years of age. The Graduate Library School of the University of Chicago admits only students with a bachelor's degree, one year of work in an accredited library school, and one year's library experience.

Prospective librarians should know what field of library work they wish to enter before choosing a library school. Most library schools equip a student for work in a public library. Some schools emphasize training for positions in universities, colleges, and other schools; others specialize in children's library work; and a few offer courses in county and regional work. A limited number of library schools offer courses in the administration of hospital, business, and other special libraries.

Most graduates of accredited library schools succeed in finding positions.

Beginning salaries vary according to the locality. The average is about \$1,500.

The American Library Association, the oldest and largest library association in the world, is largely responsible for the high professional standards which now prevail in libraries. It was organized in 1876, largely on the initiative of Melvil Dewey of Amherst College. Though almost unknown at the time, young Dewey persuaded three distinguished librarians—Justin Winsor of Boston, Lloyd P. Smith of Philadelphia, and William F. Poole of Chicago—to call a conference in connection with the Centennial Exhibition in Philadelphia. Here the American Library Association was formed. Today the nearly 16,000 members of the association represent libraries of all types in the United States and Canada and include library representatives from many countries abroad. Headquarters, with a large permanent staff, are maintained in Chicago.

GREATEST UNIVERSITY LIBRARY



Harvard has the oldest library in the United States, and the largest of American university libraries. Here we see the main reading room of the Widener Memorial Library.

The Special Libraries Association was founded in 1909 to develop the usefulness of libraries serving

business firms, banks, newspapers, scientific organizations, museums, and similar groups in the United States and Canada.

Other Organizations

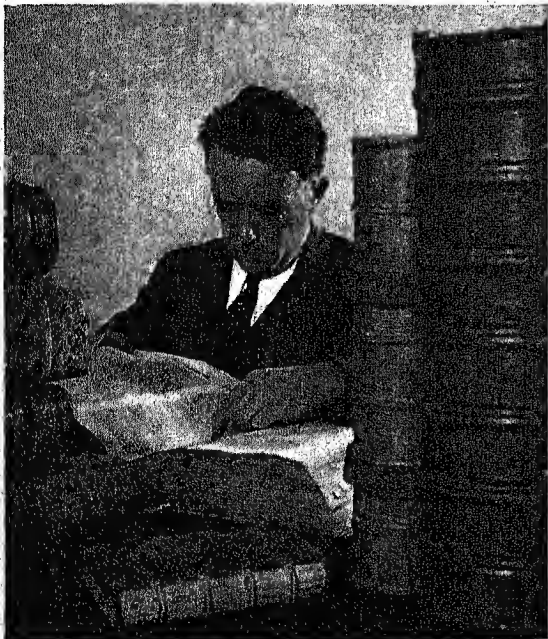
The Catholic Library Association was organized in 1921 as a section of the National Catholic Education Association and was reorganized as an independent association in 1931. Its work is largely directed toward the development and improvement of libraries in Catholic schools.

In addition to the associations already named, there are more than a dozen national organizations and over a hundred state, provincial, and regional organizations of librarians, library trustees, and other citizens interested in libraries.

Library Periodicals

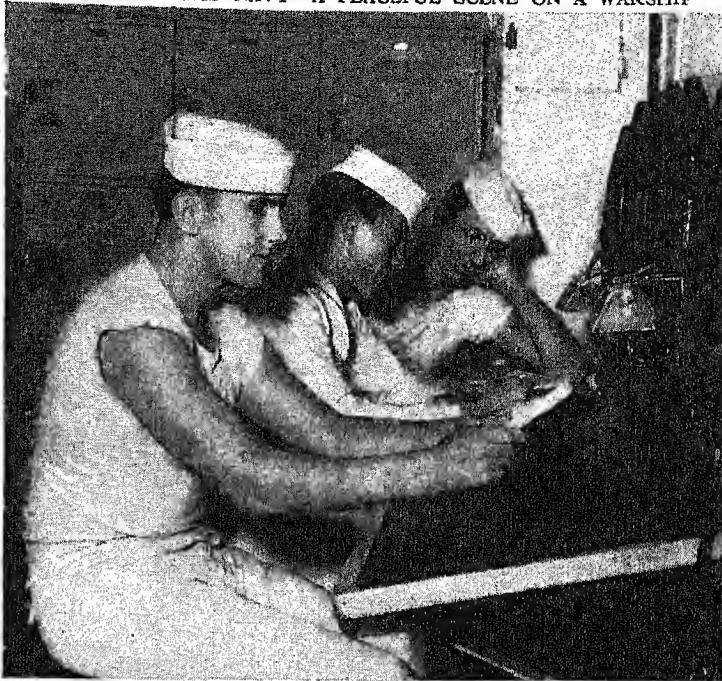
The oldest national periodical for librarians in the United States and Canada is the *Library Journal*, founded by R. R. Bowker in 1876. Widely used publications of the American Library Association include the *Booklist*, a guide to new books; the *A.L.A. Bulletin*, a clearinghouse for current news; *College and Research Libraries*; *Hospital Book Guide*; and the *Subscription Books Bulletin*. Other national periodicals include the *Catholic Library*

SURROUNDED BY RARE BOOKS



Scholars from all over the world come to the renowned Henry E. Huntington Library in San Marino, Calif., to do research work in its superb special collections. Included are many rare hand-bound volumes and original manuscripts of famous books.

BOOKS FOR THE NAVY—A PEACEFUL SCENE ON A WARSHIP



A well-organized system of ship libraries provides books for United States sailors. These men are reading in one of the casemates of a fighting ship. In making up a ship's library, books about the countries to be visited are often included.

World; *Library Quarterly*; *Special Libraries*; and the *Wilson Library Bulletin*. Many state, regional, and provincial organizations and some of the larger libraries issue monthly or quarterly publications.

Libraries in Canada and the Other Americas

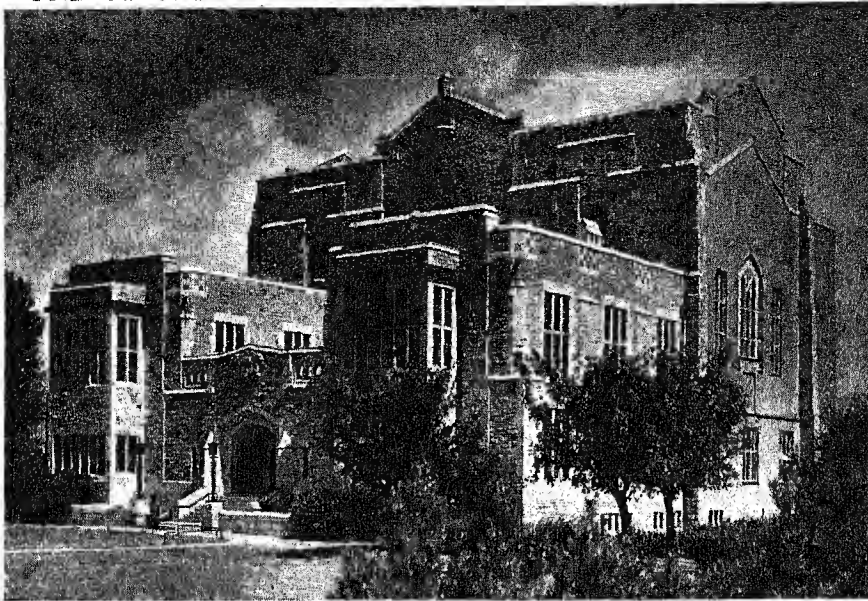
IN CANADA the problem of bringing library service to the people is vastly more difficult than in the United States. With fewer than 11 million people, Canada is considerably larger than the United States, extending from a point near Detroit to within 500 miles of the north pole. Only four cities have more than 200,000 inhabitants, and only three others have more than 100,000. In the United States more than half the people live in communities of 5,000 and over. In Canada less than half are in such places. Difficulties of transportation and severe climatic conditions further increase the problem of giving equally good library service to everyone.

The libraries of Canada are constantly growing and are improving their book collections and services. Microfilms are in common use. Many libraries have organized courses of reading and lectures and are changing their methods to meet changing conditions. Few new libraries have been built, however, since the Carnegie Corporation in 1917 discontinued its gifts for buildings.

Canada's Public Libraries

The cities and towns of Canada have public libraries much like those of the United States, though they are less well supported and accordingly not so much

ONE OF CANADA'S MANY FINE UNIVERSITY LIBRARIES



The library of the young university of British Columbia is a massive granite structure so designed as to permit expansion in three directions. Of the older universities in the eastern provinces, McGill, Toronto, and Queen's have the largest libraries.

used. Many of these libraries have branches which serve the residential areas, and some are large enough to have special technical, fine arts, and music departments. Toronto and Vancouver have separate departments for young people of high school age.

Small libraries in villages and country districts have found that they could give better service by joining together. In many parts of Canada, particularly British Columbia and the Maritime Provinces, there are regional libraries somewhat like the county and regional libraries of the United States. One of the first of these was established in 1929 in the Lower Fraser Valley of British Columbia on a grant from the Carnegie Corporation. This regional library was given full tax support by the people in the area in 1934 and has since been operated by them.

In 1933 Prince Edward Island decided to have one regional library for the whole province. This was set up with the aid of a grant of money from the Carnegie Corporation, and since 1937 the library has been carried on by the people.

After a library survey of Nova Scotia in 1937, under the auspices of the Department of Education, the establishment of regional libraries was recommended. It was found that, except for the city of Halifax, there was no place large enough to support a separate library. The government therefore passed legislation providing for the establishment of regional libraries, and in 1939

the Carnegie Corporation gave a grant of \$50,000 for this purpose. This work was suspended at the outbreak of war in September of the same year.

In rural areas not served by regional or other types of libraries, all the provinces provide service direct to readers in the form of traveling libraries. In Quebec and the Maritime Provinces this service is given through the universities; in the five westerly provinces, from the provincial capitals, usually through the library commission.

Universities and School Libraries

Canada has some 235 libraries in universities, colleges, and normal schools, with about 4,500,000 volumes and a half million pamphlets. Among the older and larger university libraries are King's College, Halifax (1789); Dalhousie University, Halifax (1818); McGill University, Montreal (1821); University of Toronto (1827); and Queen's University, Kingston (1841). Most of the younger provincial universities in the western provinces have fine libraries, that of British Columbia being the largest. Several universities give rural service through their extension departments.

THREE STORIES OF BOOKS—THE LIBRARY OF PARLIAMENT



Best known of Canadian libraries is the Library of Parliament in Ottawa. This splendid Gothic structure stands on a hill behind the Houses of Parliament and is the only one of the buildings which survived the disastrous fire of 1916. Separate libraries are maintained in many of Canada's governmental departments.

Libraries in schools are an important part of Canada's educational system. As early as 1850 Ontario had special school libraries, and it has ever since had a progressive policy of school library service. Every province now makes special grants to provide library books for schools. Many trained librarians are employed and good library quarters and equipment are to be found in nearly all large high schools.

Government and Special Libraries

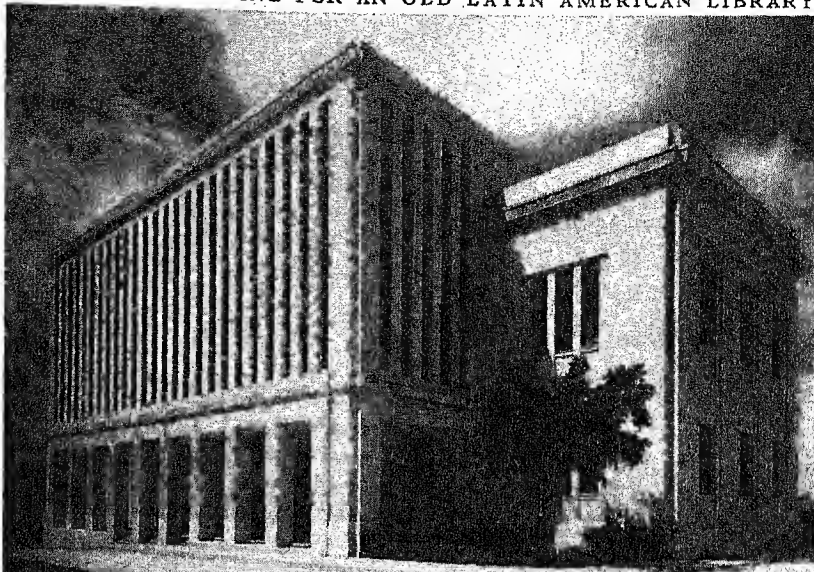
In Ottawa stands a famous example of Gothic architecture, the Library of Parliament. Here are some 400,000 volumes, kept for the use of members of Parliament. Most of the Dominion government departments have good collections of books, especially the National Research Council and the Geological Survey. Six of these contain more than 60,000 volumes each. Altogether the Dominion government operates 41 separate libraries, containing well over a million volumes. The provincial governments maintain 25 librar-

A VENEZUELAN LIBRARIAN



Librarianship is a promising field of employment for Latin American women, who do not find as many opportunities in business or the professions as do the women of the United States.

A MODERN BUILDING FOR AN OLD LATIN AMERICAN LIBRARY



This magnificently simple modern structure houses the library of the University of Havana, which dates from 1728. Though other Havana libraries have larger book collections, the university library serves the largest number of readers. This library, like others in Latin American countries, has vast archives of documents which are of great value to students of history.

ies containing more than 800,000 volumes; chief of these are the legislative libraries.

Libraries in hospitals, prisons, and similar institutions are not as well developed as in the United States, but the larger institutions do provide book service of some kind. The Canadian National Institute for the Blind circulates books in braille and Moon type from its office in Toronto. These books are mailed post free, Canada being the first country to offer this service to the sightless.

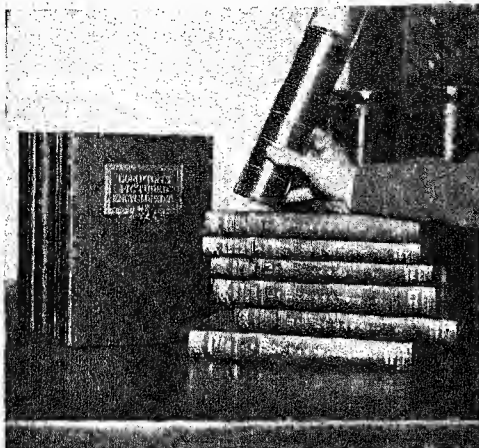
When the second World War began, a system of library service to the troops was set up under the control of the Canada Legion War Services and the Imperial Order of the Daughters of the Empire. Professional librarians volunteered to help with this work.

Library school courses leading to the degree of Bachelor of Library Science may be taken at McGill University and the University of Toronto. Summer courses especially designed for school librarians are offered in several places.

Latin American Libraries

The first libraries of Latin America were established in monasteries and universities. The oldest existing library in the Western Hemisphere is believed to be that of San Marcos University, which was founded in Lima, Peru, in 1551. National libraries began after the first quarter of the 19th century, when Latin American colonies had achieved independence from Spain. Among the largest are those of Argentina, Brazil, Chile, Colombia, Cuba, and Mexico. The vast wealth of historical material in these libraries is gradually being made available through modern methods of organization and cataloging. As interest in popular education has developed, especially in recent years,

HOW MICROFILMING SERVES THE WORLD OF BOOKS



Books, newspapers, and other documents are now photographed on tiny rolls of film, which are magnified for reading in projection machines, shown at the right. Thus library space can be saved, valuable records can be preserved for all time, and reproductions of rare books and manuscripts can be sent anywhere. Each of the rolls of film in the tube held by the hand above contains the contents of one entire volume of Compton's Pictured Encyclopedia. These films and the others recording the remaining volumes are buried in the "Crypt of Civilization" at Oglethorpe University.



there has been a corresponding interest in the spread of public and school libraries. Considerable progress has been made in Argentina, Brazil, Colombia, and Mexico. Some library schools are being established. Rural service is being developed in Mexico, and in Mexico City there are some special collections for children.

Friendly relations between librarians of Latin American countries and librarians of the United States have existed for some years. Latin American librarians are studying library practices of the United States, and a

committee of the American Library Association serves as medium for exchange of information. In 1941 an American library, the Bibliotheca Benjamin Franklin, was established in Mexico City under the supervision of the American Library Association, the Mexican government cooperating. This library provides facilities for the better understanding of American literature and the study of American library techniques.

How to Use a Library

THE BEST library in the world would be useless without careful organization. Books must be so arranged, marked, and cataloged that any book in the collection can be produced on a few minutes' notice.

Most public and school libraries in the United States and Canada arrange their books according to subject. Several classification systems are used to accomplish this purpose. Great universities and special libraries often use the Library of Congress classification. The Dewey Decimal classification is used by most public libraries and by virtually all school libraries. Melvil Dewey devised this scheme in 1876, and it has been kept up to date by his successors.

The Dewey Decimal Classification System

The Dewey Decimal classification divides books into ten main subject classes. Each class has many subdivisions. The main classes and a few of the important subjects covered in each are as follows:

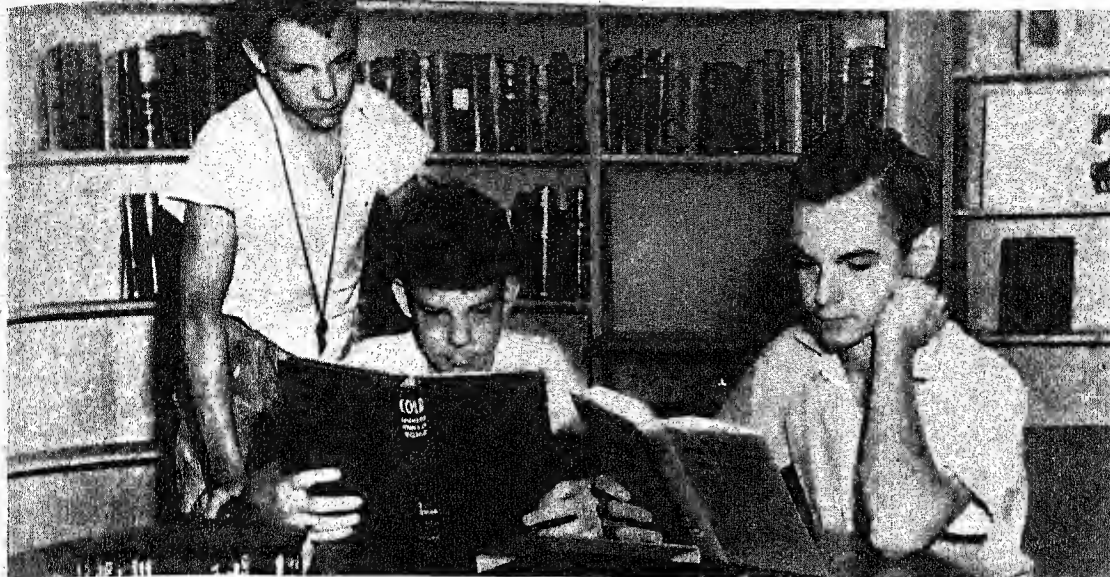
000-099 General (encyclopedias, reading lists, newspapers, magazines)
100-199 Philosophy (psychology, ethics)

200-299 Religion (Bible, myths)
300-399 Social Sciences (sociology, economics, political science, etiquette)
400-499 Grammar and Languages (dictionaries)
500-599 Science (mathematics, astronomy, chemistry, birds)
600-699 Useful Arts (agriculture, aeronautics, radio)
700-799 Fine Arts (photography, painting, music)
800-899 Literature (stories, poems, essays)
900-999 History (travel, biography)

Each of these main classes is divided into ten main subdivisions. These subdivisions are further divided through the use of decimals so that books on a special phase of any subject may stand together on the shelves. This is made clear by the following table showing subdivisions of the classification number 500, with further subdivisions of the section 598:

500 Science in general	570 Biology
510 Mathematics	580 Botany
520 Astronomy	590 Zoology
530 Physics	598 Reptiles and Birds
540 Chemistry	598.1 Reptiles
550 Geology	598.2 Birds
560 Paleontology	599 Mammals

HOW TO FIND BOOKS IN A LIBRARY



Young readers find their favorite books on the shelves of the Skinner Room in the St. Paul Public Library, which is set aside for the use of older boys and girls.



Books are placed on library shelves according to call number. The drawing above shows a group of books arranged for return to the library shelves. The first book is 'When the Stars Come Out', by R. H. Baker. The number 520 shows that the book is about astronomy. B 16 is the author number, which the librarian takes from a library aid known as the Cutter order table. The letter W is the first letter in the title of the book. Some libraries use only the initial of the author instead of the more elaborate combination of letters and numbers.



The card catalog (above) is arranged alphabetically in drawers. Guide letters on the outside of each drawer show what part of the alphabet it contains.

520 Baker, Robert Horace.
B16w When the stars come out. Viking, c1934.

520 When the stars come out.
B16w Baker, Robert Horace.

520 ASTRONOMY
B16w Baker, Robert Horace.
When the stars come out. Viking, c1934.

↑
AUTHOR CARD

↑
TITLE CARD

↑
SUBJECT CARD

Three catalog cards have been made for this book on astronomy so that the student may find it under author, title, or subject. If he should look under the heading "Stars," he would find a card referring him to the heading "Astronomy." It is interesting to note that librarians do not follow the usual custom of capitalizing all words in a title but use small letters for all words in the title except the first word and proper names.

A classification number is stamped on the back of each book. A book on birds, for example, will carry the number 598.2. Since books within the same class are arranged on the shelves by author, a symbol is often used to indicate the author. The classification number and the author symbol make up what is known as the call number.

The Card Catalog, Key to the Library

A card catalog does for a library what an index does for a book. It tells readers what books are in the library and where they may be found. With the aid of this catalog a reader can locate any book in the library if he knows its author, title, or subject. The author card in the catalog gives the name of the writer of a book on the first line, and the title on the second. The title card gives the name of the book on the first line and the author's name on the second. The subject card notes the subject of a book on the first line, followed by the author and title on the second and third lines. All cards are arranged alphabetically in cabinets according to the entry on the first line.

The shelf location of a book is found through the call number, which is usually placed on the upper left-hand corner of each card. This call number is also stamped on the back of the book. Fiction often has no call number, being arranged on the shelves alphabetically by author. For non-fiction, the top figures of the call number show the class in which a book may be found; the lower numbers represent the author and sometimes the title. The student who looks in the catalog for George Bird Grinnell's 'The Story of the Indian' would find the classification number 970.1 in the upper left-hand corner of the card. Below this class number would appear the author number, G86s. Many libraries have given up the use of an author number and use only the initial G below the classification number. For individual biography, many libraries use the letter B instead of the Dewey Decimal classification number 921. The initial letter of the name of the person about whom the book is written appears below the letter B. A book about Abraham Lincoln, for example, would be marked B with an L below, and it would be found on the biography shelves among the lives of people whose names begin with L.

The amount of information given on a catalog card varies according to the kind of library. Most small libraries use a very simple card, like those illustrated on the preceding page. Many libraries add other information, such as the size and the number of pages.

Sometimes a catalog card tells a reader who looks for books on a certain subject that he will find them under another heading. For example, if he is looking under Airdromes, he will probably find a "cross reference" card with the words "See Airports." Other cards are used to send him from a general subject to a specific subject. If a student is looking under the heading Birds for a special book on Pigeons, he will probably find a card which says "See also Pigeons."

In a small library a reader may go directly to the shelves for the book which he wants. In large systems,

book stacks are usually not open to the public and an assistant finds the books which are requested. The student consults the card catalog and writes on a slip the call number as well as the author and title of the books which he needs.

Other Aids for the Reader

Every library has indexes and other aids which help a reader to find information easily. For magazines, the most valuable aid is the *Readers' Guide to Periodical Literature*, which indexes the contents of general magazines since 1900. Libraries which have large collections of magazines usually have special periodical indexes which are of great value to businessmen, research workers, teachers, and others. For books, there are systematic book lists on all subjects; these are called "bibliographies" (see Bibliography).

To provide readers with the latest facts and figures on many subjects, most libraries have what they call "vertical files" of pamphlets and clippings. They also keep files of pictures. From such files one may get basketball or football rules, suggestions for making Christmas cards, pictures of birds or flowers, and many other kinds of information.

In most school libraries, today, young people learn how to use fact-finding books like dictionaries, encyclopedias, atlases, and almanacs, which will be helpful to them all their lives. Librarians willingly show readers how to use these important reference books.

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Seven Stories High—The Child's Own Library

CHILDREN should grow up with books of their own. Books wisely chosen to widen the world and feed the natural interests of childhood are not luxuries. They are as essential to mental and spiritual growth as right foods for the body, and some provision for their purchase should be in every household budget. Starting a children's library in the home is a responsibility that the father should share equally with the mother. It gives both an opportunity to rebuild their own ideas of what the world is like in terms of the childhood of another generation.

No search upon which parents may embark yields greater treasure than the search for the beginnings of art, literature, science, and human history as revealed in children's books. A child's book at its best is a work of art designed by its creator, whether writer or artist, to give pure joy to children. Only a few books achieve this high purpose, and the period for the keenest appreciation of them is so short that, in the list which accompanies this article, special attention is directed to books for children under seven. Tastes in subject matter vary with the individual child; but by continuous exposure to good drawing and purity of conception a lasting and discriminating taste for art in all forms may be cultivated.

The picture-books of Randolph Caldecott, for example, contain the most spirited drawings of dogs

and horses, cocks and hens, pigs and cows, to be found among books for little children. They also form for those who are older a unique pictorial record of 18th-century England. Caldecott was a master of line drawing with a genius for graphic, genial presentation of life. "What Caldecott set forth," says Arthur Rackham, "seems to me quite as important as what Dickens and Victor Hugo had to say. The milk of human kindness was in the man. There is no unkindness in his fun."



'Ride a Cock Horse to Banbury Cross', pictured by the English artist Randolph Caldecott, in his 'Pandrum Picture Book'. (Warne.)

Caldecott's picture-books are never forgotten or outgrown by those who have known them in childhood, and 'The Farmer's Boy' may well form the cornerstone of a child's own library, to be followed by other titles in board covers. They may later be renewed in more permanent bindings as the child comes to see their relation to the social history of England and to the art of illustration. Boys are interested to know that Richard F. Outcault, the American cartoonist, derived his inspiration for Tige, Buster Brown's dog, from 'The Mad Dog' pictured by Caldecott. Outcault was of the opinion that these picture-books would outlast all others. It was his lasting regret, as of many others, that Caldecott did not illustrate a complete 'Mother Goose.' His treatment of 'Ride a Cock Horse' shows how well he could have done it.



Fanchon, seen feeding the birds here, is a little girl whose daily life is told and pictured in Anatole France's 'Nos Enfants' ('Our Children: Scenes from the Country and Town'), illustrated by Boutet de Monvel.

Many artists have made pictures for 'Mother Goose', but none has yet done them supremely and for all time. Walter Crane, in 'The Baby's Opera', set forth a number of old rhymes with music by the earliest masters. This unique picture song-book and 'Vieilles Chansons', the traditional French folk-songs illustrated by Boutet de Monvel, are ideal introductions to music and to artists whose influence is incalculable in the building of a child's own library. True pictures of animal life against a background of the English lake country are to be found in Beatrix Potter's 'Peter Rabbit' and her other little books. True feeling for childhood, for gardens, and for the ways of little children springs perennially from Kate Greenaway's 'The Marigold Garden' and 'A Apple Pie'. Kate Greenaway was a friend of Randolph Caldecott and their birthdays fall within the same week of early spring. Children enjoy and remember the association of the gift of certain books with the birthdays of artists such as these.

Let Books be Joyful Gifts

Making an event, a festive occasion, of the gift of a book to the child's own library is a tradition in many families. It should bring the joy of a welcome visitor, and it will, if the book has been chosen with the child's taste at the moment clearly in mind. And since new tastes spring up from week to week, from month to month, from year to year, parents cannot afford to let slip any opportunity to share the reading interests of their children. In this way only is it possible to relate books to life in the two worlds every child must rediscover for himself—the world of the imagination and the great world without.

The world that children live in today has changed remarkably in a generation; yet childhood itself remains unchanged in fundamental characteristics. Children demand, first of all, sheer enjoyment from their books. They are naturally intensely interested in what they see going on about them, but the transfer of that interest to its mere reflection in a book at once suggests the immediately useful—the roughage rather than the vitamins of the arts. If the world is to mean very much, the imagination must be chiefly fed the food on which it thrives—good drawing, fine music, genuine nonsense, lyric poetry, wonder stories, and heroic tales in memorable language.

To the young child the wide world is not too big nor too far away to wonder about and explore, and so a large map of the world should be one of the first purchases for the children's library. Unburdened by considerations of time or distance, a child will think it good fun to look for Pelle's home in Sweden or to follow Milki to Hungary. By the natural roads of carefully selected picture-books, he will acquire a familiarity with different countries and ways of living which will illuminate the whole background of future geographical and historical study. The choice of picture-books, then, becomes highly significant not only for these values, but also for the distinctive qualities of drawing and design of the countries in which they have originated.

Influence of Picture-books

The picture-books of a country may well point the way to a livelier sense of values in its folk-tales and legends, its music and drama, its painting and native arts, its novels and social history. It is upon this assumption and out of years of experience in close association with children and books that the list of books which accompanies this article has been made.

Continued association during the formative years with good drawing and color printing, with poetry and song, with genuine nonsense and authentic prose, whether imaginative or realistic in conception, does build taste and interest in world history and world literature.

Children of the same family differ as widely in reading tastes as in other matters. Children of the same age in different families will read at different levels. The suggestion of physical age is, therefore, to be considered with full regard for the reading age of the individual, and this can be learned only by sharing the reading interests of children on equal terms. Companionship in reading, whether from a



From Caldecott's 'Picture Book', illustrating Goldsmith's 'Elegy on the Death of a Mad Dog'. (Warne.)

page of print or from "what the picture says," is a tie that binds closer than any other. No child should miss this experience in his home.

No parent should fail to recognize this opportunity to enrich his own understanding of childhood and literature. Just as the love of reading springs quite spontaneously out of the experience of reading for oneself or of sharing voluntarily the reading of one who really likes the same book, so the judgment required in making an independent choice of books for a home library may be developed by early and continued practice in choosing and weighing the choices of others.

The children's rooms of public libraries afford ideal opportunities for the child, from picture-book age to well into the teens, to find out the books in which he is most interested. Parents will gain many suggestive ideas by visiting public libraries with their children when in doubt about what book to buy next. The joy of discovery is one of the chief joys of reading. To find for oneself that one book among many is good or poor is of great importance to the young reader. He has taken the first step in the never-ending obligation to make up his own mind.

Learning to Choose Wisely

Boys and girls in companionship with the books of well-selected children's libraries are not merely choosing the books they wish to read and to use, but by choosing freely they are learning how to discriminate, to judge, to tolerate, to admire. They may not be able to tell exactly what they are learning; yet when they are entrusted with funds to add to the libraries already started for them by their parents, they give convincing evidence that they know which books to buy and which ones to rely upon the library or the school to supply. It is with the expectation of this reliance upon the library or the special book-shop to recommend the most up-to-date books for purchase in the fields of science, the mechanical arts, games, and sports, that such books do not appear in the accompanying list.

When to Start a Library

The age at which children begin to have money to spend is the age at which they may well begin to buy books for their library. Few children will make many purchases before they are seven; and we may assume that the floor-plans and the door and window spaces for the first three stories of "Seven Stories High"—the

child's own library—will be built by parents in intimate touch with their children and with the books they already have. Special book-shelves should be provided within reach of the child, who shares with the book-lover the delight of the feel of the book in his hand.

Avoid Too Many Books

It is a mistake to provide many books for the young child; better, a few which are worth looking at again and again. Indiscriminate gifts of garish books for

babies should no more be tolerated than indiscriminate feeding. A child of five once made the scathing comment, as she pointed to a shelf of non-descript picture story-books, "Those are such books as daddy brings from the drug store. My real books are in my room." The father in question had been, as a boy, a great admirer of Howard Pyle and still treasured all his books among his own possessions. He had not taken time to consider the difference between any book for a child of five and a real book. Nor had it occurred to him that interest in art, whether pictorial or literary, grows according to what it feeds upon when young.

Though some children take to books and reading like ducks to water, and others do not, many are given the desire to read by a well-conceived plan for placing the right books within reach at the right time. The method involves definite preparation on the part of the parent. One must know not

only children's books in relation to books in general, but also the reactions of children to them at different stages. There are many printed lists and articles on children's reading which may be consulted. The parent who wishes to enjoy the unbroken companionship and confidence of his children will take time to consult them and to make such a plan for his own family as the children themselves will become interested to carry on and enlarge from year to year.

Pleasures of Building a Library

Children, when given a fair chance, are very much interested in personal ownership of books. They like to build libraries of their own. They like to separate and arrange their books on the shelves and count the number and the kind of books they own. Moreover, they are often excellent critics of books from whom an older reader can learn much.

This critical instinct is strengthened by thoughtful buying of books and by a certain amount of experience

TWELVE POINTS OF INQUIRY IN BUYING BOOKS

To prospective book buyers for their own home libraries, these points of inquiry are suggested:

1. *Is it a book you can and want to read now?*
2. *What is it about?*
3. *Who wrote it?*
4. *Is the author a good writer? How do you know?*
5. *Who illustrated the book?*
6. *Do the pictures tell you anything?*
7. *Is the book well printed?*
8. *Has it an attractive binding?*
9. *Is there a better book on the same subject?*
10. *Is there a more expensive or a cheaper edition of the same book? Which do you prefer to own and why?*
11. *Will the purchase of this book make your library more interesting and more varied?*
12. *Is it a book you really want to own or just read and pass along?*

in clearing deadwood from their book shelves from year to year. Of course, even with the best of plans, some books will be bought which will serve a temporary need or will prove disappointing. A child's indifference to reading may often be traced to well-intentioned but ill-timed gifts of too many children's classics at Christmas or of books of information which are out of date.

No one sees more quickly that a book of scientific or historical information is inaccurate or out of date than the intelligent boy of 11 to 13 years of age, who is accustomed to consult books in well-conducted school or public libraries. He should be allowed to buy the book that he knows has reliable information. He should not be given books that are selected at random or because they seem a bargain.

More thoughtful purchase of children's books as books rather than as mere toys or articles of merchandise leads to clearer realization that growth in knowledge and strength of character come from literature that is a record of life itself. The sense of fun, the love of beauty, the power to contemplate both the visible world and the unseen, the skill to make practical application of what one sees and feels and knows in the ordinary affairs of everyday life—all these are to be found in children's books of the present day as

well as of an earlier time. Since this is so, contemporary publications of quality and appeal have been listed below, side by side with well-known classics.

Books of Proved Value

In considering the successive stages of such a list, arranged as a kind of progressive treatment of reading viewed as an art rather than a science, it should be remembered that every so-called "classic" of childhood was once a new book. It is not the purpose of the following list to include all the books that any one child should read, nor is it designed to cover all branches of knowledge. Its value is rather to offer certain fundamental materials that have been tested and a plan that will aid constructive thought and expression on the part of boys and girls.

Since reading has long been accorded its own place among sports as well as among the essential requirements of a sound education, it is well for parents to remember that a high degree of skill in any contest is the result of fearlessness and long practise.

"We assimilate knowledge less through our intellects than our temperaments," says James Stephens, "and a young person can by no effort look through the eyes of an older." Boys and girls who are living in increasing intimacy with well-chosen books are making enduring friendships in their discovery of the world.

A List of Books for Children's Own Libraries For Children under Three Years Old

The Farmer's Boy. By Randolph Caldecott. (Warne.) An ideal first picture-book for a baby, with all the farmyard animals. One of 16 books in board covers by an English artist whose work was distinguished for simplicity of line.

The Baby's Opera. Illustrated by Walter Crane. (Warne.) Old rhymes with music by the earliest masters. A unique picture song-book by an English artist who designed many beautiful books.

Four and Twenty Blackbirds. Illustrated by Robert Lawson. (Stokes.) Traditional nursery rhymes. Selected by Helen D. Fish. Music for 13 of them. Large-size jolly pictures.

Ring o' Roses. By L. Leslie Brooke. (Warne.) A picture-book of old rhymes in clear soft colors. This English artist also illustrated 'Andrew Lang's Nursery Rhyme Book'.

Apply Dapply's Nursery Rhymes. By Beatrix Potter. (Warne.) This artist is the creator of a series of little books in color which are true pictures of animal life and English countryside.

A Apple Pie. By Kate Greenaway. (Warne.) Little children enjoy this A B C book by an artist who has true feeling for childhood. Kate Greenaway's 'Mother Goose' is a charming little book.

Animals Everywhere. By Ingri and Edgar Parin d'Aulaire. (Doubleday.) A first picture book which unfolds into a

panorama showing animals in their native settings from tropics to arctic zone. Designed for the artists' two-year-old son. Printed in four colors.

Pelle's New Suit. By Elsa Beskow. Translated by Marian Woodburn. (Harper.) A realistic picture-book in color by a

Swedish artist whose 'Wee Little Old Woman' is a great favorite.

The Chicken World. By E. Boyd Smith. (Putnam.) Lively drawings of chickens by an American artist who has made a number of picture-books in color.

The Hey Diddle Diddle Picture Book. By Randolph Caldecott. (Warne.) One of four famous English picture-books children should own. Caldecott excelled in the drawing of horses and dogs.

The A B C Bunny. By Wanda Gág. (Coward.) A beautiful and original picture-book. An adventurous bunny runs back to Nature by way of the alphabet. The story has been set to music for the endpapers.

The Nursery Rhyme Book. Edited by Andrew Lang. Illustrated by L. Leslie Brooke. (Warne.)

A full collection of Mother Goose rhymes which includes a valuable preface and notes. The pictures delight both children and parents. Children also like 'The Little Mother Goose'. Illustrated by J. W. Smith. (Dodd.)



This is the little pig who cried "wee-wee-wee" all the way home, before he was lost. Drawn by L. Leslie Brooke in his 'Ring o' Roses', a collection of Mother Goose rhymes. (Warne.)

In My Mother's House. By Ann Nolan Clark. Illustrated by Velino Herrera. (Viking.) Pueblo Indian life in a lovely picture story-book.

Early One Morning in the Spring. By Walter de la Mar. (Macmillan, 1935.) A refreshing and richly suggestive book for any reader who feels a lively interest in children and childhood. An English poet of the 20th century shares the

fruits of his wide reading of childhood memories of famous people and offers wit and wisdom derived from his own childhood experience and that of children he has known.

Complete Nonsense Book of Edward Lear. Edited by Lady Strachey. (Dodd.) This edition contains all the original pictures and verses dating from 1843. Indispensable for a home library.

For Children from Three to Five Years Old

The Tale of Peter Rabbit. By Beatrix Potter. (Warne.) The famous Peter Rabbit made his first appearance in this little book. 'Benjamin Bunny', 'Squirrel Nutkin', 'Mrs. Tiggy-Winkle', 'Mr. Jeremy Fisher', and 'Tom Kitten' are companion volumes. The author is also the artist.

History of Tom Thumb. Pictures by Hilda Scott. (Holiday.) A well-designed little book that children love. 'Thumbelina' in same format.

Three Blind Mice. By J. W. Ivimey. Illustrated by Walton Corbould. (Warne.) An old rhyme with pictures children like.

Johnny Crow's New Garden. By L. Leslie Brooko. (Warne.) A new picture story-book of birds and animals. A companion to 'Johnny Crow's Garden' and 'Johnny Crow's Party'.

The Little House. By Virginia Lee Burton. (Houghton.) A modern American picture story-book of originality and charm with an immediate appeal to children of any age. 'Mike Mulligan and His Steam Shovel' in story and pictures has all the gusto and detail boys like.

A Child's Day. By Walter de la Mare. Illustrated by Winifred Bromhall. (Holt.) A story of Ann and what she did one long summer day told in rhyme by a true poet of childhood.

Who Goes There? By Dorothy P. Lathrop. (Macmillan.) A true-to-Nature picture story-book.

Sing Song. By Christina Rossetti. (Macmillan.) Poems and rhymes by an English poet.

The Happy Heart Family. By Virginia Gerson. (Duffield.) A Valentine picture story-book first made for the children of William Chase, the American painter.

The Legend of the Palm Tree. Illustrated by Paulo Werneck. (Grosset.) An old Indian legend. The large-size pictures in color are by a well-known Brazilian painter.

The Cock, the Mouse and the Little Red Hen. By Félicité Le Pèvre. With pictures by Tony Sarg. (Macrae.) A favorite for both pictures and story.



This 'little dog laughs to see the sport', to be found in 'Tales of Laughter', edited by Kate Douglas Wiggin and Nora Smith. The lively illustrations are by Elizabeth MacKinstrey. (Doubleday.)

Helen Sewall. (Viking.) True-to-life stories of a Texas childhood with universal appeal.

A B C Book. By C. B. Falls. (Doubleday.) The best modern Alphabet book by an American artist whose posters are well known. Designed for the artist's little girl who asked for "a big book of all pictures."

The Golden Goose Book. By L. Leslie Brooko. (Warne.) One of the most satisfactory picture story-books. Contains

also 'The Three Bears', 'The Three Little Pigs', and 'Tom Thumb', each of which may be had separately in paper covers.

The Children's Book. Selected by Horace E. Scudder. With many illustrations. (Houghton.) "A collection of the best and most famous stories and poems in the English language." Made by the foremost American critic of children's literature of his day, and as good 50 years after. For a whole family of different ages.

The Christ Child. Told by Matthew and Luke. With pictures by Maud and Miska Petersham. (Doubleday.) Recreates in full color and with child-like appeal the background of the boy Jesus. The text is that of the Bible.

The Story of Little Black Sambo. By Helen Bannerman. (Stokes.) A picture story-book children delight in. 'Sambo and the Twins' is just as much fun and more adventurous.

Picture Tales from the Russian. By Valery Carriek. (Stokes.) Folk-stories of animals, with line drawings that children find delightful. The companion volumes also are good.

Miki. By Maud and Miska Petersham. (Doubleday.) A gay picture story-book about a visit to Hungary. Realistic text by the artists.

A Round of Carols. Illustrated by Helen Sewell. Music arranged by T. Tertius Noble. (Oxford.) Carols of all seasons adapted from familiar English, French, German, and Czech tunes.

Madeline. By Ludwig Bemelmans. (Simon.) The beauty of Paris and true understanding of children are in this large-size picture-book in color.

Tag-Along Tooloo. By Frances Clarke Sayers. Illustrated by Helen Sewall. True-to-life stories of a Texas childhood with universal appeal.

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How Eliza looked after the elves tried to lift her out of bed by her hair. From 'Eliza and the Elves', by Rachel Field. Picture drawn by Elizabeth MacKinstrey. (Macmillan.)



How Eliza looked in her tight little cap, taking the kinks out of her hair. Drawn by Elizabeth MacKinstrey for 'Eliza and the Elves' by Rachel Field. (Macmillan.)

For Children from Five to Seven Years Old

Tales from Grimm. Freely translated and illustrated by Wanda Gág. (Coward.) The artist's pictures and translation embody all the wonder and magic of the old tales. Grimm's 'Fairy Tales', with woodcuts by Fritz Kredel (Stackpole), is a fuller collection for older children.

The Listening Child. Edited by Lucy W. Thacher. Illustrated by Nancy Barnhart. (Macmillan.) A well-chosen anthology which includes a selection of modern poetry made by Marguerite Wilkin-

son.
Alice's Adventures in Wonderland. By Lewis Carroll. Illustrated by Sir John Tenniel. (Macmillan.) At what age Alice will appeal is always a question. Be sure to choose an edition with Tenniel pictures, and add to the library of children to be read as soon as it is wanted. 'Through the Looking Glass' is a companion book. The two may be had in one volume but are less appealing in that form.

Tales of Laughter. Edited by Kate Douglas Wiggin and Nora A. Smith. Illustrated by Elizabeth MacKinsty. (Doubleday.) Favorite folk and fairy tales in excellent versions with lively decorations by an American artist.

Little Songs of Long Ago. By Alfred Moffatt. Illustrated by A. Willeboek Le Mair. (McKay.) Delicate pictures in color by a Dutch artist make a charming gift book of this and its companion volume 'Our Old Nursery Rhymes'.

Just So Stories. By Rudyard Kipling. (Doubleday.) Juvenile edition. A book of animal stories for all ages.

Child's Garden of Verses. By Robert Louis Stevenson. Illustrated by Charles Robinson. (Scribner.) There are many editions of Stevenson's verses. This is an attractive one.

Winnie-the-Pooh. By A. A. Milne. Illustrated by Ernest H. Shepard. (Dutton.) A modern nonsense story for lovers of Teddy Bear, Christopher Robin, and nonsense.

Clean Peter. By Ottilia Adelborg. (Longmans.) A clever picture-book putting a premium on cleanliness by an artist whose 'Bilderbok', in color (Bonnier), gives a fine pictorial idea of life in Sweden.

Dash and Dart. By Mary and Conrad Buff. (Viking.) A year in the life of twin fawns. True to nature and to art. Sensitive line drawings. Full pages in colors.

Children of the Northlights. By Ingri and Edgar Parin d'Aulaire. (Viking.) The artists went to Lapland to make the sketches and absorb the colors and other impressions which have gone to the making of a beautiful and true-to-life picture story-book.

The Wonderful Locomotive. By Cornelia Meigs. Illustrated by Berta and Elmer Hader. (Macmillan.) A good railroad story first told by Cornelia Meigs to her nephew.

Davy and the Goblin. By Charles Carryl. Illustrated by E. B. Bensell. (Houghton.) A dream story by an American author. Inspired by 'Alice in Wonderland' but with an original quality of its own.

Taytay's Tales. By Elizabeth DeHuff. (Harcourt.) Folktales of the Pueblo Indians retold with spirit. The pictures are by a young Indian boy.

The Songs We Sing. By Hendrik Willem Van Loen. Music arranged by Grace Castagnetta. (Simon.) The gayest and most popular of song books.

Susanna's Auction. Illustrated by Boutet de Monvel. (Macmillan.) (Little Library.) An amusing story of a naughty little French girl with expressive drawings in black and white.

When Molly Was Six. By Eliza Orne White. (Houghton.)

Good for the birthday of a little girl who likes a realistic story. This author's stories are always true to life and well written.

Ola. By Ingri and Edgar Parin d'Aulaire. (Doubleday.) A beautiful and childlike large picture story-book of Norway which is authentic in spirit and in detail.

The Velveteen Rabbit. By Margery Wil-

liams Bianco. Illustrated by William Nicholson. (Doubleday.) The story of a nursery toy and how it became real, with very lifelike illustrations in color. A favorite Christmas or Easter story.

A Book of Cheerful Cats. By Joseph Greene Francis. (Century.) Hailed as a "funny book" by children of three generations.

A Roundabout Turn. By Robert H. Charles. Illustrated by L. Leslie Brooke. (Warne.) A nonsense tale in rhyme with ageless appeal.

When We Were Very Young. By A. A. Milne. Illustrated by Ernest H. Shepard. (Dutton.) Rhymes with pictures which have delighted both children and grown-ups by their dramatic quality.

Millions of Cats. By Wanda Gág. (Coward.) The most popular American picture story-book of recent years.

Little Toot. By Hardie Gramatky. (Putnam.) A tugboat in New York harbor is the hero of a refreshing book illustrated from water colors.

Down, Down the Mountain. By Ellis Credle. (Nelson.) A picture story-book about two children, Hetty and Hank, who live in a log cabin in the Blue Ridge Mountains. Original and true to life.

Get-a-way and Hány János. By Maud and Miska Petersham. (Viking.) Fresh character and meaning are given to toys by this gay and beautiful picture-book. The color printing is remarkably fine.

The Dutch Twins. By Lucy Fitch Perkins. (Houghton.) A very popular book with children who are

learning to read and beginning to know children of other countries. Companion volumes.

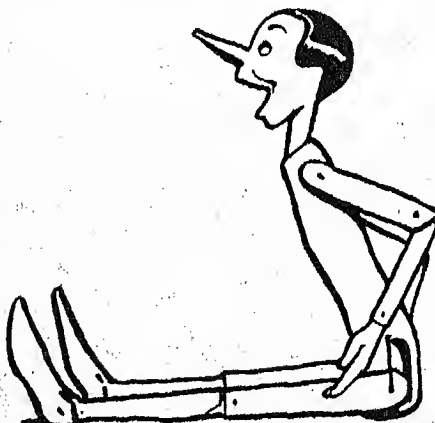
The Cautious Carp. By Nicholas Radlov. (Coward.) Animal fables told in pictures with a line of text. The fun and vitality of the comic strip are here combined with the draftsmanship of a fine artist.

East o' the Sun and West o' the Moon. Translated by Mrs. Gudrun Thorne-Thomsen. (Row.) Old tales from the Norwegian retold by a born story-teller. For older children the Dasent translation edited and illustrated by Ingri and Edgar Parin d'Aulaire. (Viking.)

English Fairy Tales. By Joseph Jacobs. (Putnam.) Stories



Hänsel and Gretel escape from the witch's wood by riding across the stream on a duck's back. From a volume of immortal German fairy tales, 'Household Stories by the Brothers Grimm'. (Macmillan.) Translated by Lucy Crane. Illustrated by Walter Crane.



Pinocchio, the marionette, as Attilio Mussino pictured him for the story of that name by Collodi. (Macmillan.)

to tell or read aloud. Joseph Jacobs wrote them down just as he heard them told by English country folk.

Pincocchio. By C. Collodi. Translated by Walter S. Cramp. Illustrated by Charles Copeland. (Ginn.) An excellent translation of the Italian classic for the younger children.

Little Tim and the Brave Sea Captain. By Edward Ardizzone. (Oxford.) A large-size picture story-book of life at sea from vigorous water colors first painted for the artist's little son.

the New Testament. Each of the thirteen full-page drawings is a deeply felt interpretation of the story illustrated.

The Painted Pig. By Elizabeth Morrow. With pictures by René D'Harnoncourt. (Knopf.) A Mexican picture-book in many colors with a true story of Mexican life by Mrs. Dwight Morrow.

The Fairy Circus. By Dorothy P. Lathrop. (Macmillan.) An American picture story-book of rare imaginative quality. Text and pictures give it permanent value.



In the center picture Christopher Robin is fastening Eeyore the donkey's tail more securely for him, while Pooh Bear looks on with great interest. The pictures at either side show Eeyore, very happy to have his tail again, admiring it from all angles. These illustrations by Ernest Shepard are for 'Winnie-the-Pooh', a collection of stories about a little boy and his toys, by A. A. Milne. (Dutton.)

Make Way for Ducklings. By Robert McCloskey. (Viking.) Boston is the true background for this adventurous family of ducklings. A robust and beautiful picture-book. 'Lentil', the story by the same author of the boy who wakes up an Ohio town with his harmonica, appeals to the next age group and to adults.

The First Bible. Illustrated by Helen Sewell. (Oxford.) The text is that of the King James Bible, selected and arranged by Jean West Maury from the Old Testament and

The Story About Ping. By Marjorie Flaek and Kurt Wiese. (Viking.) A jolly picture story-book of a duck whose home is a Chinese houseboat.

The Five Chinese Brothers. By Claire Huchet Bishop and Kurt Wiese. (Coward.) A dramatic retelling of an old Chinese tale which appeals to boys of any age.

Powder. By Esther Averill and Lila Stanley. Illustrated by Fedor Rojankovsky. (Random.) The story of a colt, a duchess, and the circus, told in brilliant colors.

For Children from Seven to Nine Years Old

Pictures to Grow Up With. By Katherine Gibson. (Studio.) A fresh presentation of pictures from medieval times to contemporary painters accompanied by brief clear text.

The Ageless Story. By Lauren Ford. (Dodd.) The story of the child Jesus retold in a series of twelve contemporary paintings by a distinguished American artist who has also illuminated the Gregorian chants which accompany her pictures. A rare and beautiful book.

Gulliver's Travels. By Jonathan Swift. Illustrated by Louis Rhead. (Harper.) Children read this satire as a wonder story. Attractive editions are illustrated by Arthur Rackham (Dutton), and Willy Pogany (Macmillan).

King of the Golden River. By John Ruskin. Illustrated by Arthur Rackham. (Lippincott.) A classic tale.

The Tailor of Gloucester. By Beatrix Potter. (Warne.) A Christmas story of rare charm and literary quality. John Masefield likes this story.

The Story of Doctor Dolittle. By Hugh Lofting. (Stokes.) The first and best of several books telling the adventures of the famous animal doctor. Illustrated by the author and first written for his own children.

Snow White and the Seven Dwarfs. Freely translated



The little wooden doll and the mistress she remembered as she lay in the attic forgotten. From 'The Little Wooden Doll', by Margery Williams Bianco. Illustrated by Pamela Bianco. (Macmillan.)

and illustrated by Wanda Gág. (Coward.) A lovely book for any age.

The Adventures of Odysseus and The Tale of Troy. By Padraic Colum. Illustrated by Willy Pogany. (Macmillan.) A modern version of the 'Odyssey', retold for children. 'The Golden Fleece' is a companion volume.

Seventy Stories of the Old Testament. Illustrated with reproductions from master woodcut artists of the 15th and 16th centuries. Compiled by Helen Slocum Estabrook. (Bradford.) Heroic stories chosen from the King James Version of the Bible by a mother who also chose the notable woodcuts to illustrate them. A very distinguished book of large size.

The Wonder Book. By Nathaniel Hawthorne. Illustrated by Walter Crane. (Houghton.) A beautiful book which Crane came to this country to design.

Arabian Nights Entertainment. Edited by Andrew Lang. (Longmans.) An attractive edition in large print with fewer stories is edited by Kate Douglas Wiggin. (Scribner.)

In the Days of Giants. By Abbie Farwell Brown. (Houghton.) The most satisfactory rendering of the Norse myths for younger children.

The Great Geppy. By William Pene DuBois. (Viking.) A

fantastic story of a red- and white-striped circus horse with interpretive drawings in color.

Seven Simeons. Retold and illustrated by Boris Artzybasheff. (Viking.) A Russian picture story-book of great distinction.

Aesop's Fables. Edited by Joseph Jacobs. (Macmillan.) Illustrated by Richard Heighway. An excellent edition of Aesop. Children will appreciate fables more at this age than when younger.

The Jungle Book. By Rudyard Kipling. (Doubleday.) Children have their favorite stories in the 'Second Jungle Book' as well as in the first. Kipling should be read aloud.

Uncle Remus, His Songs and His Sayings. By Joel Chandler Harris. Illustrated by A. B. Frost. (Appleton.)

A. B. Frost re-created these stories with his pictures, which are inseparable from them. Read aloud.

The Wender Cleave. By Howard Pyle. (Harper.) An indispensable book for the whole family in which Howard Pyle has re-created old tales and legends in pictures as well as in words.

Tirra Litra; Rhymes Old and New. By Laura E. Richards. Illustrated by Marguerite Davis. (Little.) Memorable nonsense verse. A book for the whole family.

The Chippendale Dam. By Hugh Troy. (Oxford.) A spirited modern story with a folk quality. Delightful pictures in color of pet beavers, Chippendale furniture, and the Metropolitan Museum of Art.

The Magic Fishbone. By Charles Dickens. Illustrated by F. D. Bedford. (Warne.) A gay holiday fantasy of the Princess Alicia, her 17 children, and the Fairy Grandmarina. Children love both story and pictures.

Water Babies. By Charles Kingsley. Illustrated by J. W. Smith. (Dodd.) An attractive edition of a well-known classic which requires skipping to make it acceptable to some children.

The Golden Spears. By Edmund Leamy. (Longmans.) Irish fairy tales first told to Mr. Leamy's children in Ireland. Read aloud.

The Little Lame Prince. By Mrs. D. M. Craik. Little Library Edition. (Macmillan.) 'The Adventures of a Brownie' is published as a companion volume.



Brer Rabbit, before he lost his long bushy tail. In 'Uncle Remus, His Songs and His Sayings', a noted collection of plantation stories, by Joel Chandler Harris. Illustrations by A. B. Frost. (Appleton.)

Mr. Bumps and His Monkey. By Walter de la Mare. Illustrated by Dorothy P. Lathrop. (Winston.) A fascinating story of the friendship between an English sailor and a very wise monkey who is trained for the stage. Pictures in color appeal to any age.

The Doll Who Came Alive. By Enys Tregarthen. Edited by Elizabeth Yates. Illustrated by Nora Unwin. (Day.) A Cornish fairy tale of Jyd and her doll, with lovely pictures in color.

Swiss Family Robinson. By Johann David Wyss. Illustrated by Louis Rhead. (Harper.)



This mouse has just called a council to decide how to provide some clothes for the little wooden doll. Drawn by Pamela Bianco for 'The Little Wooden Doll'.

The most satisfactory pictures of any of several editions.

Red Jungle Boy. By Elizabeth K. Steen. (Harcourt.) The Brazilian jungle is vividly and accurately pictured in this true story of a ten-year-old boy of the Carajas Indian tribe.

Henner's Lydia. By Marguerite De Angeli. (Doubleday.) A picture story-book in color of the Pennsylvania Dutch country by an artist who has intimate knowledge of its life.

Andy and the Lion. By James Henry Daugherty. (Viking.) Based on the old story of Androcles and the Lion. Vigorous drawings and understanding of the small boy make this a picture-book for any age.

Kart the Elephant. By Dhan Gopal Mukerji. (Dutton.) A fascinating

animal tale in which a boy of nine is given a baby elephant to take care of.

Rip Van Winkle. By Washington Irving. Illustrated by N. C. Wyeth. (McKay.) This edition with pictures in color gives an impression of the Hudson River country. The edition illustrated by Arthur Rackham is a fascinating one.

Chi-Wee. By Grace Moon.

Illustrated by Carl Moon.

(Doubleday.) The story of a little Indian girl in the American desert of which Carl Moon's pictures give an excellent idea.



Mr. Possum tells his troubles to Brer Rabbit. From 'Uncle Remus, His Songs and His Sayings'.

Hansi. Story and pictures by Ludwig Bemelmans. (Viking.) True and amusing adventures of a little boy of Innsbruck who spent the Christmas holidays with his uncle in a wonderful old house in the Austrian Tyrol.

Mei Li. By Thomas Handforth. (Doubleday.) An American artist while living in China made a picture story-book which is true to Chinese life. A distinguished book.

Little Men. By Louisa M. Alcott. (Little.) This book, although it follows 'Little Women', interests younger girls and is read by boys.

Poems of Childhood. By Eugene Field. Illustrated by Maxfield Parrish. (Scribner.) A selection of these poems is set to music.

The Princess and the Goblin. By George MacDonald. Illustrated by F. D. Bedford. (Macmillan.) One of the best of wonder stories. There is a more expensive edition illustrated by Jessie Willcox Smith and published by McKay.

The Little Wooden Doll. By Margery Bianco. Illustrated by Pamela Bianco. (Macmillan.) An appealing story with delightful pictures by an artist who was a child when she made them.

Peter Pan in Kensington Gardens. By J. M. Barrie. Illustrated by Arthur Rackham. (Scribner.) If this story of the boy who would not grow up is beyond children, wait until they are ready for it. The simplified version is poor. Many children prefer to read 'Peter and Wendy'.

The Firelight Fairy Book. By Henry Boston. Illustrated by Maurice E. Day. (Little.) Well-written modern fairy-tales which ring true. The larger edition is more attractive for the home library.

Rootabaga Stories. By Carl Sandburg. Illustrated by Maud and Miska Petersham. (Harcourt.) Nonsense, fantasy, and reality are in these very original American stories. Read aloud.

Nicholas. By A. C. Moore. Illustrated by Jay van Everen. (Putnam.) A story of New York. 'Nicholas and the Golden Goose' carries it to Europe.

The Reformed Pirate. By Frank Stockton. Illustrated by Reginald Birch. (Scribner.) Jolly tales by a favorite storyteller; introduction by Mary Gould Davis.

To and Again. By Walter R. Brooks. Illustrated by Adolfo Best-Maugard. (Knopf.) Farmyard animals travel to Florida by way of Washington. Well written and amusing to read aloud.

Johnny Appleseed and Other Poems. By Vachel Lindsay. (Macmillan.) This volume includes poems both for little children and for older ones.

Peterkin Papers. By Lucretia P. Hale. Illustrated by Harold Brett. (Houghton.) An old favorite among "funny books" with new pictures in color.

And to Think That I Saw It on Mulberry Street. By Dr. Seuss. (Vanguard.) A very original picture-book in bright colors with a complete story in rhyme. "The cleverest book I have met with for many years," says Boatrix Potter. 'The 500 Hats of Bartholomew Cubbins' is a modern fanciful tale which has the quality of legend. Universal in its appeal.

Emil and the Detectives. By Erick Kästner. Translated by May Massee. Illustrated by Walter Trier. (Doubleday.) An excellent translation of the adventures of high-spirited small boys of Berlin.

Mary Poppins. By P. L. Travers. Illustrated by Mary Shepard. (Reynal.) A strong Australian wind blows Mary Poppins with umbrella and carpetbag into a story that is pure fun.

Wild Animals I Have Known. By Ernest Thompson Seton. (Scribner.) One of the first popular story-books about wild animals.

The Blue Fairy Book. Edited by Andrew Lang. Illustrated by H. J. Ford. (Longmans.) The first of the famous 'Colored Fairy Books' edited by Andrew Lang and a great favorite.

Peacock Pie. By Walter de la Mare. Illustrated by W. Heath Robinson. (Holt.) Rhymes and poems for children of all ages.

Floating Island. Written and illustrated by Anne Parrish. (Harper.) An original and remarkably well-written story of the adventures of a family of dolls shipwrecked on a tropical island.

Heidi. By Johanna Spyri. Translated by Helen B. Dolo. Illustrated by Marguerite Davis. (Ginn.) A centennial edition of this popular story of a little Swiss mountain girl which has interesting pictures made on the spot.

Thimble Summer. By Elizabeth Enright. (Farrar.) A charming modern story of a little girl's summer on a Wisconsin farm. 'The Sea Is All Around' has a Nantucket background.

Little House in the Big Woods. By Laura Ingalls Wilder. Illustrated by Helen Sewell. (Harper.) The drawings for this true story of life in a Wisconsin log cabin are as finely American as the text.

The Boy Who Could Do Anything, and Other Mexican Folk Tales. Retold by Anita Brenner. Illustrated by Joan Charlot. (Scott.) True to Mexico in text and illustrations. Excellent format.

Wee Gillis. By Munro Leaf. Illustrated by Robert Lawson. (Viking.) A small boy makes a canny choice between the Lowlands and Highlands of Scotland. Delightful pictures.

The Story Book of Science. By Jean-Henri Fabre. Translated by F. C. Bioknell. (Century.)

'The Secret of Everyday Things' is by the same distinguished French scientist.

Italian Peepshow. By Eleanor Farjeon. Illustrated by Rosalind Thornycroft. (Stokes.) Charming stories with a background of Italy.

Spunky. By Berta and Elmer Hader. (Macmillan.) A fine story of a Shetland pony told by the artists in words and pictures.

Pilgrim's Progress. By John Bunyan. Illustrated by George Cruikshank. (Oxford.) Complete text. A retold version by Mary Godolphin. Illustrated by Robert Lawson. (Stokes.)

Robinson Crusoe. By Daniel Defoe. Illustrated by N. C. Wyeth. (McKay.) Full page pictures in color, clear print.

The Book of Discovery. By M. B. Syngé. Illustrated. (Putnam.) A capital book on exploration. Attractive in make-up with interesting illustrations and maps.

The Willow Whistle. By Cornelia Meigs. Illustrated by E. Boyd Smith. (Macmillan.) An exceptionally well written story of pioneer children, Indians, and buffaloes.

What Happened to Inger Johanne. By Dikken Zwilgmeyer. Translated by Emilie Poulsson. (Lothrop.) The story of a Norwegian girl who has kinship with Tom Sawyer.

Alice and Thomas and Jane. By Enid Bagnold. Illustrated by the author and Laurian Jones. (Knopf.) Lively adventures of a family of English children at home and in France.

ADVENTURES IN A ZOO



Nicholas visits the Bronx Park Zoo and rides on a tortoise, while the eagle and the wolf look on, asking him to come see the other birds and animals. Illustrations by Jay van Everen, in 'Nicholas', by Anne Carroll Moore. (Putnam.)

For Children from Nine to Eleven Years Old

The Merry Adventures of Robin Hood. By Howard Pyle. (Scribner.) The best prose version of the Robin Hood ballads. Illustrated by the author.

The Forge in the Forest. By Padraic Colum. Illustrated by Boris Artzybasheff. (Macmillan.) Old stories of Fire, Water, Earth, and Air retold by an Irish poet, with unusual pictures by a young Russian artist.

The Story of Roland. By James Baldwin. (Scribner.) The most readable version of the 'Song of Roland' for boys and girls.

Treasure Island. By Robert Louis Stevenson. Illustrated by N. C. Wyoth. (Scribner.) "The best of boys' books and a book to make one a boy again. The buccaners are real bloody rascals, no sham of it."—George Meredith.

The Hobbit; or, There and Back Again. By J. R. R. Tolkien. Illustrated by the author. (Houghton.) A story of rare beauty and originality in which dwarfs and dragons live again for imaginative boys and girls.

Fairy Tales. By Hans Christian Andersen. Translated by Mrs. Edgar Lucas. (Dutton.) A well-known attractive edition. Rex Whistler's illustrations and beauty of format distinguish an edition published by Cobden-Sanderson.

The Wonderful Adventures of Nils. By Selma Lagerlöf. Translated by Volma Swanston Howard. Illustrated by Mary H. Frye. (Doubleday.) A wonder story and a wonderful book about Sweden by the foremost novelist of that country.

The King of Ireland's Son. By Padraic Colum. Illustrated by Willy Pogany. (Macmillan.) A book of Irish folk tales, 'The Big Tree of Bunlahy', illustrated by Jack Yeats, contains new stories.

The Wonder Smith and His Son. By Ella Young. Illustrated by Boris Artzybasheff. (Longmans.) Irish legends retold in beautiful prose by a poet who spent 20 years collecting the stories.

Tales from Shakespeare. By Charles and Mary Lamb. Illustrated by Elizabeth Shippen Green Elliott. (McKay.) Twenty of Shakespeare's plays retold in story form but retaining Shakespeare's words when possible.

Master Skylark. By John Bennett. Illustrated by Reginald Birch. (Century.) A vivid tale of Shakespeare's time by an American writer who also wrote 'Barnaby Rook'.

Puck of Pook's Hill. By Rudyard Kipling. Illustrated by Arthur Rackham. (Doubleday.) This book and 'Rewards and Fairies' have the essential spirit of English history in them.

A Little Boy Lost. By W. H. Hudson. (Knopf.) A dream story with the South American childhood of the great naturalist for its background.

The Wind in the Willows. By Kenneth Grahame. Illustrated by E. H. Shepard. (Scribner.) The joyous adventures of Water Rat, Mole, Badger, and Toad in the world of River Bank and Wild Wood. 'The Reluctant Dragon' (Holiday) was first published as a chapter of 'Dream Days'.

At the Back of the North Wind. By George MacDonald. Illustrated by F. D. Bedford. (Macmillan.) One of the best of imaginative stories of which there are several editions.

Billy Barnicoat. By Greville MacDonald. Illustrated by

F. D. Bedford. (Dutton.) The romantic story of a boy cast up by the sea on the coast of Cornwall. True to Cornish life and speech. The writer is the son of George MacDonald.

Rainbow Gold. Compiled by Sara Teasdale. Illustrated by Dugald Walker. (Macmillan.) A poet's invitation to read poetry for its own sake. An attractive book for a birthday.

The Rose and the Ring. By William Makepeace Thackeray. (Macmillan.) Thackeray made his own illustrations for this Christmas pantomime from which a charming play for marionettes can be given.

Tree Toad. By Bob Davis. Drawings by Robert McCloskey. (Stokes.) True stories of the California boyhood of the author and his "brother Bill." Full of laughter and human interest.

Miss Muffet's Christmas Party. By Samuel McChord Crothers. (Houghton.) A book in which the characters in children's books come alive to children and grown-ups.

Waterless Mountain. By Laura Adams Armer. Illustrated by Sidney Armer and Laura Adams Armer. (Long-

mans.) The story of a Navajo Indian boy in search of the legends back of tribal customs.

The Country of the Dwarfs. By Paul B. du Chaillu. Illustrated by Erick Berry. (Harper.) Du Chaillu's hooks about Africa are still fascinating to boys because based upon his observations and experience as an early traveler and explorer.

Shasta of the Wolves. By Olaf Baker. (Dodd.) A remarkably good animal story by an Englishman who also wrote 'Dusty Star', the story of an Indian boy and a wolf cub.

The Call of the Wild. By Jack London. Illustrated by Charles Livingston Bull. (Macmillan.) A very powerful dog story of absorbing interest to boys.



Here Robin Hood, equipped for a tussle, encounters the gorgeous, amazing Will Scarlet. The picture is from 'The Merry Adventures of Robin Hood', written and illustrated by Howard Pyle. (Scribner.)

Merry Robin stops a Stranger
in Scarlet:



"Effort" was a quality very necessary to the early pioneers, who faced the tasks of hewing down the timber, cultivating the cleared space, hunting the wild beasts of the forests, and working hard daily to preserve life itself. This illustration was drawn by James Daugherty for 'Daniel Boone: Wilderness Scout', by Stewart Edward White, (Doubleday.)

Away Goes Sally. By Elizabeth Coatsworth. Pictures by Helen Sewell. (Macmillan.) The story of a little girl of 1800 who is transplanted from Massachusetts to Maine in a little house on runners drawn by twelve oxen. Illustrations and story have true distinction. 'Alice-All-By-Herself' is also a favorite book.

The Story of a Bad Boy. By Thomas Bailey Aldrich. Illustrated by A. B. Frost. (Houghton.) A story of the author's own boyhood adventures in Portsmouth, N. H., and a pioneer among books about boys.

The Adventures of Tom Sawyer. By Mark Twain. (Harper.) Looking back on his boyhood in Missouri, Mark Twain created Tom out of three boys he then knew.

Penrod. By Booth Tarkington. (Doubleday.) Penrod is a boy character as popular with girls as with boys.

Captains Courageous. By Rudyard Kipling. (Doubleday.) A story of the Grand Banks, in which the son of a millionaire is rescued by the *We're Here o' Gloucester*.

Daniel Boone. Written and illustrated by James H. Daugherty. (Viking.) A beautiful and timely book which has the pioneer flavor and authenticity gained from following the Boone trail.

Young Trailers. By Joseph Altsheler. (Appleton.) Altsheler grew up in the Daniel Boone country. His stories have reality and Parkman behind them. He has written several excellent books for boys.

Two Little Confederates. By Thomas Nelson Page. Illustrated by John W. Thomson, Jr. (Scribner.) New pictures re-create the old story.

The Golden Basket. By Ludwig Bemelmans. (Viking.) The whole city of Bruges comes to life in this unique book. The artist-author's modern pictures have the quality of old Flemish paintings.

Hans Brinker or The Silver Skates. By Mary Mapes Dodge. Illustrated by G. W. Edwards. (Scribner.) Mrs. Dodge first told this famous story to her own two boys. It grew out of her own great interest in 'The Rise of the Dutch Republic.' It also represents the pioneer sports story.

Men of Iron. By Howard Pyle. (Harper.) An exceptional story of the time of King Henry IV. 'Otto of the Silver Hand', a story of the robber barons, is also suggested.

Happy Times in Norway. By Sigrid Undset. (Knopf.) A true picture of contemporary Norway before the invasion and an intimate seasonal record of the life of the great novelist and her children.

A Day on Skates. By Hilda Van Stockum. Illustrated by the author. Foreword by Edna St. Vincent Millay. (Harper.) A delightfully illustrated and well-told story of an all-day skating tour in Holland. The 'Cottage at Bantry Bay'. (Viking.) Reveals the artist-author's love of Ireland.

Hitty, Her First Hundred Years. By Rachel Field. Illustrated by Dorothy P. Lathrop. (Macmillan.) The story of a wooden doll who has wonderful adventures on land and sea. Authentic background of American life.

The Mysterious Island. By Jules Verne. Illustrated by N. C. Wyeth. (Scribner.) A thrilling drama of the air in the year 1865. 'Twenty Thousand Leagues Under the Sea' is

issued in similar form. Many of Jules Verne's "dreams" have been proved to have a scientific basis.

Rebecca of Sunnybrook Farm. By Kate Douglas Wiggin. Illustrated by Helen Mason Grose. (Houghton.) Rebecca was not drawn from life but is a character born of the author's lively fancy into the New England of her childhood.

Little Women. By Louisa M. Alcott. Illustrated by Jessie Willcox Smith. (Little.) A story out of Louisa Alcott's own childhood which every American girl should own.

Blue Willow. By Doris Gates. Illustrated by Paul Lantz. (Viking.) A recent story of rare quality.

Vinny Applegay. By Ethel Parton. (Viking.) A charming story of a lively little New England girl who comes to New York in 1870.

The Little Prince. By Antoine de Saint-Exupéry. Translated by Katherine Woods. (Reynal.) A modern fairy tale with fresh magical qualities drawn from the stars, the African desert, and the vivid childhood memory of the French author-artist whose water colors are very childlike.

The Alhambra. By Washington Irving. Illustrated by Joseph Pennell. (Macmillan.) The best introduction to the beauty and romance of Spain.

The Three Mulla Mulgars. By Walter de la Mare. Illustrated by Dorothy P. Lathrop. (Knopf.) A purely imaginative story of three royal monkeys.

The Goldsmith of Florence. By Katharine Gibson. Decorations by Kalman Kubinyi. (Macmillan.) An impressive book of great craftsman which has grown out of

the interest of boys and girls at the Cleveland Art Museum.

The Secret Garden. By Frances Hodgson Burnett. (Stokes.) A mystery story with a Yorkshire garden for its setting.

The Three Policemen. Written and illustrated by William Pène Du Bois. (Viking.) A modern fabulous tale of great charm and originality. Interpretive drawings are fascinating.

Phoebe Fairchild. By Lois Lenski. (Stokes.) A lively, authentic story of a ten-year-old Connecticut child of the 1830's. The artist-author has achieved an exceptional book of interest to collectors of children's books as well as to children.

Where Is Adelaide? By Eliza Orne White. Illustrated by Helen Sewell. (Houghton.) A new classic of childhood.

Ben and Me. Written and illustrated by Robert Lawson. (Little.) An amusing story accompanies these masterly drawings of Benjamin Franklin as observed by his "good mouse Amos." Boys of all ages find it delightful.

The Voyages of Jacques Cartier. Retold by Esther Averill. Illustrated by Feodor Rojankovsky. (Domino Press.) Authentic story of the three voyages with distinguished drawings.

Beethoven, Master Musician. By Madeline Goss. (Doubleday.) A dramatic narrative of the personal life of the composer. Of special interest to children familiar with music.

The Good Master. By Kate Seredy. (Viking.) A lively young girl from Budapest goes to live on her uncle's farm in Hungary. A popular true story-book with colorful pictures.

The Moffats. By Eleanor Estes. Illustrated by Louis Slobodkin. (Harcourt.) Living children have been created in this story of a Connecticut family. 'The Middle Moffat' sustains their claim.



Nils, the boy who became an elf, as pictured by Mary Hamilton Fryc in 'The Wonderful Adventures of Nils', by Selma Lagerlöf, translated by Velma Howard. (Doubleday.)

For Children from Eleven to Thirteen Years Old

Kidnapped. By Robert Louis Stevenson. Illustrated by N. C. Wyeth. (Scribner.) 'David Balfour' is the sequel to this stirring historical romance.

Jim Davis. By John Masefield. Illustrated by Mead Sebaeffer. (Stokes.) A story of smugglers of the Devon Coast. A good book to follow 'Treasure Island'.

The Bold Dragoon. By Washington Irving. Illustrated by James Daugherty. (Knopf.) This collection contains five good mystery tales.

Ivanhoe. By Sir Walter Scott. Illustrated by Maurice Greiffenhagen. (McKay.) A large print illustrated edition

Daugherty. (Doubleday.) A genuine comic history revived and enlivened by a modern artist.

Stories of Norse Heroes. By E. Wilmot-Buxton. (Crowell.) An excellent version of Norse myths.

The Story of King Arthur and His Knights. By Howard Pyle. (Scribner.) There are three companion volumes—'The Story of the Champions of the Round Table'; 'Sir Launcelot and his Companions'; 'The Story of the Grail'.

Adam of the Road. By Elizabeth J. Gray. Illustrated by Robert Lawson. (Viking.) Medieval England comes alive in this fine historical story of a wandering minstrel's son.



Elouise tho Fair, with many attendants, welcomes Sir Launcelot in the courtyard of the abbey. One of the incidents from 'The Story of the Champions of the Round Table', written and illustrated by Howard Pyle. (Scribner.)

which makes an attractive gift. 'The Talisman'; 'Quentin Durward', and 'Kenilworth' are also to be had in similar form.

A Dog at His Heel. By C. J. Finger. Illustrated by H. C. Pitz. (Winston.) An absorbing tale for boys; with an authentic background of Australia and South America.

Java Ho! By Johan Wigmore Fabricus. Abridged and translated from the German by M. C. Darnton. (Coward.) A robust story of adventure on the high seas and the island of Sumatra, based on the old log book of Bontekoe.

The Voyages of Captain Scott. By Charles Turley. (Dodd.) Retold from 'The Voyage of the Discovery' and 'Scott's Last Expedition'. A book of absorbing interest to boys.

Knickerbocker's History of New York. By Washington Irving. Edited by A. C. Moore. Illustrated by James

Children of the Dawn. Elsie Finnimore Buckley. (Stokes.) Well-told romantic Greek tales, contains 'Hero and Leander', 'The Sacrifice of Alcestis' and others.

The White Isle. By Caroline D. Snedeker. Illustrated by Fritz Kredel. (Doubleday.) Britain seen through the eyes of an exiled Roman girl who seems contemporary to readers of 1940.

This Singing World. Edited by Louis Untermeyer. Illustrated by Florence M. Ivins. (Harcourt.) This attractive anthology contains a good proportion of modern poetry.

The Last of the Mohicans. By J. Fenimore Cooper. Illustrated by N. C. Wyeth. (Scribner.) It is over a hundred years since 'The Last of the Mohicans' was published, carrying to France and England new pictures of American Indians.

The Prince and the Pauper. By Mark Twain. (Harper.) The boy king, Edward VI, and Tom Canty, a poor boy of the period, change places.

Columbus Sails. Written and illustrated by C. Walter Hodgos. (Coward.) Imagination and vigor give color and life to this story of Columbus as told by a young English artist.

Who Rides in the Dark? By Stephen W. Meader. (Harcourt.) A stirring adventure story of stage-coach days in New Hampshire. Boys like this author.

George Washington's World. By Genevieve Foster. (Scribner.) Gives a cross-section of the world at the time in readable text accompanied by many pictures by the author. Lights up American history.

The Matchlock Gun. By Walter D. Edmonds. Illustrated by Paul Lantz. (Dodd.) A dramatic true story of a New York colonial family. 'Tom Whipple' visits the Russian emperor.

Rolling Wheels. By Katharine Grey. (Little.) An absorbing story of a journey by covered wagon from Indiana to California.

Master Simon's Garden. By Cornelia Meigs. (Macmillan.) There is romance and an authentic historical background in this well-written story of New England in colonial times.

Ghend, the Hunter. By Dhan Gopal Mukerji. Illustrated by Boris Artzybasheff. (Dutton.) Some boys may prefer 'Gay-Neck', the story of a carrier pigeon, which is illustrated by the same artist.

Bob, Son of Battle. By Alfred Ollivant. Illustrated by Marguerite Kirmse. The sheep-dog trials are vividly pictured in this fine story of dogs and dalesmen.

Smeky. By Will James. (Scribner.) The story of a cowpony written in the vernacular of the cowboy and illustrated by the author with spirited drawings.

Swift Rivers. By Cornelia Meigs. Illustrated by Forrest W. Orr. (Little.) A finely conceived story of rafting logs down the Mississippi River from northern Minnesota in the year 1835.

Once in France. By Marguerite Clément. Illustrated by Gormaino Denonain. (Doubleday.) Stories from French history and legend, including one of Joan of Arc's friend.

Down-a-Down Derry. By Walter de la Mare. Illustrated by Dorothy P. Lathrop. (Holt.) Several of these poems have been set to music.

Mehitable. By Katharine Adams. (Macmillan.) The story of a New England girl who goes to school in Paris. Miss Adams has written a number of good stories with European backgrounds she knew as a girl.

Downright Dencey. By Carolino Dale Snedaker. (Doubleday.) An interesting story of a Quaker girl who lived on Nantucket Island a hundred years ago.

The Jumping Off Place. By Marian McNeely. (Longmans.) The story of a family of children and the "claim" they inherited in Dakota.

Young Fu of the Upper Yangtze. By Elizabeth Foreman Lewis. Illustrated by Kurt Wiese. (Winston.) Life in a modern Chinese city vividly presented in a convincing story for boys and girls. The pictures are true to life.

Shuttered Windows. By Florence C. Means. Illustrated by Armstrong Sperry. (Houghton.) A fine story of a northern Negro girl who goes from a Minnesota high school to live with her great-grandmother in South Carolina. This author always tells a good story.

Call It Courage. By Armstrong Sperry. (Macmillan.) The story of a boy who lived in a small island in the Pacific. 'Wagons Westward' (Winston) by the same author is liked.

The Black Tanker. By Howard Pease. (Doubleday.) Mystery and danger surround the hero of this book in a ship bound for the Orient in wartime. 'The Tattooed Man' and 'Jinx Ship' are earlier books.

The Adventures of Huckleberry Finn. By Mark Twain. Illustrated by E. W. Kemble. (Harper.) This is a reprint of the original edition. The illustrations are delightful.

Young Walter Scott. By Elizabeth Janet Gray. (Viking.) In this unusual biographical story Sir Walter Scott comes alive as a real boy growing up in a real Edinburgh. Points the way to John Buchan's life of Scott.

The Adventures of Sherlock Holmes. By Conan Doyle. (Harper.) The discovery of Sherlock Holmes is a great event in everyday life.

The Trumpeter of Krakow. By Eric Kelly. Illustrated by Angela Pruszyńska. (Macmillan.) A stirring mystery story with a background of 15th-century Poland.

The Three Musketeers. By Alexandre Dumas. Illustrated by Mead Schaeffer. (Dodd.) 'The Three Musketeers' begins in the year 1626 with the appearance of D'Artagnan and ends in 1628. 'Twenty Years After' picks up the narrative for a twelve-month in 1648. The 'Vicomte de Bragelonne' covers the period 1660-71.

The Story of Mankind. By Hendrik Van Loon. (Live-right.) A fascinating world story illustrated with animated maps and many drawings by the author.

The White Stag. By Kate Seredy. (Viking.) A dramatic retelling in story and pictures of a famous Hungarian epic.

The Pageant of Chinese History. By Elizabeth Seeger. Illustrated by Bernard Watkins. (Longmans.) A reliable story of China, with pictorial maps.

Garrism, the Hunter. By Herbert Best. Illustrated by Erick Berry. (Doubleday.) The story of a boy hunter and his dog in the African hills.

Wind of the Vikings. By Maribelle Cormack. (Apploton.) A stirring tale of the Orkney Isles with an authentic background of Viking lore.

Swallows and Amazons. By Arthur Ransome. Illustrated by Helene Carter. (Lippincott.) A lively story of six children, two sailboats, and a "desert island" located in one of the English lakes.

Lone Cowboy. By Will James. Illustrated by the author. (Scribner.) The true story of Will James's adventurous life.

Caddie Woodlawn. By Carol Ryzie Brink. Illustrated by Kate Seredy. (Macmillan.) Frontier life in Wisconsin is pictured vividly in this book. 'Anything Can Happen on the River' is about France.

The Bastable Children. By E. Nesbit. (Coward.) This book by a well-known writer of children's stories contains 'The Treasure Seekers', 'The Would-Be-Goods', and 'The New Treasure Seekers'.

Splice and the Devil's Cave. By Agnes Danforth Hewes. Decorated by Lynd Ward. (Knopf.) A tale of the struggle for control of the sea route to the Indies.

Meggy McIntosh. By Elizabeth Janet Gray. (Doubleday.) A story of North Carolina before the American Revolution.

Roller Skates. By Ruth Sawyer. Illustrated by Valenti Angelo. (Viking.) A rare true story of Lucinda who explores New York on roller skates in the 1890's.

Pecos Bill. By James C. Bowman. (Albert Whitman.) Tall tales of "the Greatest Cowboy of all Time" retold with imagination and humor.

A Book of Americans. By Rosemary and Stephen Vincent Benét. Illustrated by Charles Child. (Farrar.) Original and inspiring portraits in verse.

For Readers from Thirteen Years Old Onward

Wind, Sand and Stars. By Antoine de Saint Exupéry. (Reynal.) A true story of adventure by a French aviator who is also a poet and philosopher. Covers the period 1926-36.

The Stream of History. By Geoffrey Parsons. (Scribner.) An exceptionally clear and authentic world history in one volume, written with imaginative power.

Davy Crockett. By Constance Rourke. Illustrated by

James MacDonald. (Harcourt.) An authentic biography which keeps the adventurous flavor of Crockett's character.

Penn. By Elizabeth Janet Gray. (Viking.) William Penn becomes a living man in this absorbing biography.

The Yearling. By Marjorie K. Rawlings. (Scribner.) Florida is the background of this fine American novel, with a boy and his father the chief characters.

Drums. By James Boyd. Illustrated by N. C. Wyeth. (Scribner.) A story of the American Revolution with North Carolina for its background.

John Brown's Body. By Stephen Vincent Benét. (Doubleday.) A special edition of this fine American poem, designed especially for boys and girls; spiritedly illustrated by James Daugherty.

Abraham Lincoln, the Prairie Years. By Carl Sandburg. (Harcourt.) A biography in which the writer makes one feel the poetry at the heart of wilderness life.

Walt Whitman: Builder for America. By Babette Deutsch. (Messner.) A timely and reliable biography by an American poet. The book includes also a selective arrangement of Whitman's poetry.

Kim. By Rudyard Kipling. (Doubleday.) Kim lived in a life wild as that of the 'Arabian Nights'.

Mutiny on the Bounty. By Charles Nordhoff and James Norman Hall. (Atlantic; Little.) A rousing novel of the sea, based largely on fact. The authors got the material from Admiralty records of the strange history of H. M. S. *Bounty*, which set sail from England in 1787 bound for Tahiti.

Come Hither. Selected by Walter de la Mare. Illustrated by Alec Buckels. (Knopf.) A poet's anthology of lyrical and imaginative poems, chiefly English, with introduction and notes of great value.

The Tree of Life. Edited by Ruth Smith. Illustrated by Boris Artzybasheff. (Viking.) Selections from the Literature of the World's Religions. Presented in a very beautiful book of special interest to boys and girls seeking to understand the peoples of other lands.

Christmas Carols. Illustrated by Hendrik Willem Van Loon. Music arranged by Grace Castagnetta. (Simon.) A joyous book for any age.

Salt-Water Poems and Ballads. By John Masefield. (Macmillan.) A favorite volume of Masefield's poems among boys.

Moby Dick. By Herman Melville. Illustrated by Mead Schaeffer. (Dodd.) A great sea story.

Far Away and Long Ago. By W. H. Hudson. (Dutton.) The life story of a great naturalist told by himself. Hudson wrote of the wild life and the human drama of South America and rural England.

A Nonsense Anthology. Selected by Carolyn Wells. (Scribner.) A good selection of nonsense verse.

Martin Pippin in the Apple Orchard. By Eleanor Farjeon. (Stokes.) Stories and old singing games in a Sussex apple orchard. For girls who like to read plays.

Cranford. By Mrs. Gaskell. Illustrated by Hugh Thomson. (Macmillan.) True to the life and ways of a North of England village.

Lost Worlds. By Anne Terry White. (Random.) Adventures in archeology. A book of absorbing interest.

Complete Works of William Shakespeare. (Oxford.) To possess all Shakespeare in one volume appeals to girls and boys who own copies of individual plays illustrated by Arthur Rackham or Edmund Dulac.

Pride and Prejudice. By Jane Austen. Illustrated by Charles E. Brook. (Macrae.) "Elizabeth's mind was too full for conversation." Jane Austen, whom enjoyed, is a lifelong delight.

Madame Curie. By Eva Curie. (Doubleday.) "Madame Curie is, of all celebrated beings, the only one whom fame has not corrupted," said Einstein. This true story of her remarkable life confirms his words.

Invincible Louisa. By Cornelia Moigs. (Little.) The life story of Louisa M. Alcott told with feeling and rare discrimination.

Enchanting Jenny Lind. By Laura Benét. (Dodd.) A vivid pictorial biography of the great Swedish singer who enchanted Mendelssohn and Hans Andersen and was brought to America by P. T. Barnum.

Dobry. By Monica Shannon. Illustrated by Atanas Katchamakoff. (Viking.) An unusual story of a Bulgarian peasant boy who left the farm of his ancestors to become a sculptor. The artist who made the drawings also contributed of his boyhood memories. A distinguished book.

The Bird of Dawning. By John Masefield. (Macmillan.) A fine sea story of the days of the clipper ship and China trade and a race for the London prize.

A Tale of Two Cities. By Charles Dickens. Illustrated by Rowland Wheelwright. (Dodd.) A story of the French Revolution which rarely fails to interest boys and girls.

A Daughter of the Seine. By Jeanette Eaton. (Harpor.) An interesting life story of Madame Roland with vivid pictures of the French Revolution.

Les Misérables. By Victor Hugo. Illustrated by Mead Schaeffer. (Dodd.) The text of this edition has been cut to some extent. The form is attractive to boys and girls.

Introducing Charles Dickens. By May Lamberton Becker. Illustrated by Oscar Ogg. (Dodd.) This fine book by a Dickens lover brings him to life for present-day readers.

North to the Orient. By Anne Morrow Lindbergh. Maps by Charles A. Lindbergh. (Harcourt.) Describes in an unforgettable way the flight which the Lindberghs made in 1931. Records the pure magic of flying.

Tales. By Edgar Allan Poe. (Appleton.) Mystery stories which are masterpieces of invention and originality to which Conan Doyle pays a tribute which is very impressive to boys and girls.

These Happy Golden Years. By Laura Ingalls Wilder. (Harper.) The final volume in a rare series of American story books dealing with the pioneer youth of the author.

My Antonia. By Willa Cather. (Houghton.) This fine story of American pioneer life is a good introduction to Willa Cather's books.

Second April. By Edna St. Vincent Millay. (Harpor.) Miss Millay has made a selection of her poems for young people but they really want more than it includes.

Mythology. By Edith Hamilton. Illustrated by Steele Savage. (Little.) A contemporary treatment of Greek mythology which gives it life. Based on sound scholarship. Dramatic illustrations.

The Mutineers. By Charles B. Hawes. (Little.) A fine tale of the sea and adventure in the Orient. 'The Dark Frigate' and 'The Great Quest' are also good.

The James. By Blair Niles. (Farrar.) This book contains a very human picture of young George Washington riding down the Duke of Gloucester Street. The Rivals of Amorica series planned and originally edited by Constance Lindsay Skinner is a fresh approach to American history.

From Immigrant to Inventor. By Michael Pupin. (Scribner.) The interesting autobiography of a Serbian herdsboy who became an American scientist and inventor of international fame.

Calico Bush. By Rachel Field. Illustrated by Allen Lewis. (Macmillan.) A vivid story of a young French girl's life on the Maine coast in the 18th century.

Lawrence, the Story of His Life. By Edward Robinson. Illustrated with a frontispiece in color and 32 pages of plates. (Oxford.) The author of this intensely interesting biography served under T. E. Lawrence in Arabia.

The Lost Queen of Egypt. By Lucile Morrison. (Stokes.) The romance of the wife of Tutankhamon.

The Diary of Selma Lagerlöf. Translated by Velma Swanston Howard. (Doubleday.) A fascinating journal kept by Selma Lagerlöf during a winter in Stockholm when she was 14. A most attractive gift book for a birthday.

Towers in the Mist. By Elizabeth Goudge. (Coward.) A charming recent novel with Oxford in Elizabethan times for its background. 'Smoky House' delights younger girls.

The Human Comedy. By William Saroyan. Illustrated by Don Freeman. (Harper.) California is the background for this true-to-life story of a telegraph messenger boy and his family in wartime. Spirited illustrations.

Editor's Note.—Other annotated lists of books will be found with the articles on Hobbies and Story-Telling. The article on Literature for Children is a history of children's books and illustrations; it contains a list of the best guides to the selection of children's literature.

ANCIENT AND MODERN LIBYA

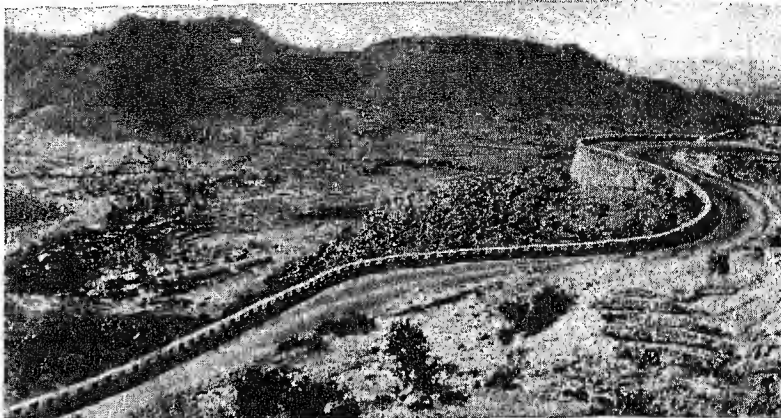
LIBYA. The ancient name of Libya recalls 3,000 years of history. This name was first applied by the Greeks to the whole of Africa. Later the Romans used it for one of their African provinces. Then it fell into disuse, to be revived by the Italians in 1912, when they took the region from the Turks and started to develop an African empire.

The region lies between Tunisia and Algeria on the west and Egypt on the east. It stretches for more than a thousand miles along the Mediterranean Sea, and extends almost as far into the Sahara and Libyan deserts (for map, see Africa). With an area of 680,000 square miles, it is larger than Alaska by a hundred thousand square miles.

The parching influence of the trade winds makes the vast desert hinterland one of the hottest and most barren of countries. Ninety-five per cent of all Libya is shifting sand or barren steppe, punctured here and there by a *jebel* (the Arabic word for "mountain").

The Land and Its Products

Most of Libya is a great, limestone tableland, covered in parts



The paved highway above follows the coast for 1,200 miles. Stately ruins attest the splendor of Leptis Magna (center). Below, Italian colonists haul to their new farms the supplies given them by the Fascist government. Some 18,000 of such colonists were carried to Libya in a single fleet.

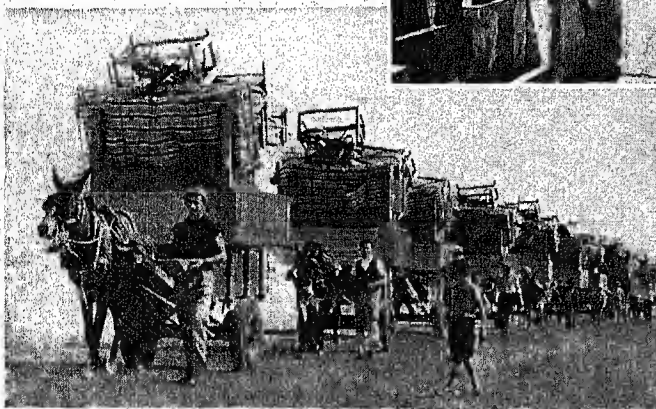


tropical fruits can be grown, by dry farming or irrigation. The eastern portion, Cyrenaica, has no coastal plain, but it can grow dates, olives, and barley for making beer or feeding cattle, sheep, and goats. Water for towns can be obtained by sinking artesian wells to the water table which underlies most of Libya, even in the Sahara.

The Sub-Desert and the Desert

South of the arable coastal fringe the country slopes through ever-thinning pasture lands to the sub-desert, where little grows but the alfa plant (esparto grass), a tall grass which is exported to be made into paper. The vast reaches of the Libyan and Sahara deserts make up the rest (see Sahara).

About 300 miles south of the Gulf of Sidra is a depression in the tableland called the Hofra (meaning "ditch"). This dips near enough to the water table to produce oases in some spots; water can also be obtained from shallow wells. A western group of oases, called the Fezzan, supports the region's largest town, Murzuk. Here date palms, olives, figs, and almonds relieve the desert barren-



ness, and some grain can be grown. The Kufu oases to the east were controlled by fanatical Senussites, until the Italians broke their power in 1928.

Industries other than farming are few. The sponge and tunny fisheries are important, and salt and sulphur are mined. Tobacco is manufactured, and carpets, leather articles, and embroidered fabrics.

Government and Modern History

The western portion, Tripolitania, has a narrow coastal plain. Here cereals, cotton, tobacco, and

Italy gained possession of Libya after the Italo-Turkish war of 1911-12. The coastal area was later

divided into four provinces—Tripoli, Bengasi, Misurata, and Derne (Derna)—which were proclaimed integral parts of the Italian kingdom. They have an area of 217,000 square miles and a population of about 840,000, mostly Arabs, Berbers, and Jews. Into them Italy poured thousands of settlers and vast sums for irrigation, buildings, roads, harbors, farm implements, and work animals. The desert region to the south was organized as a military territory.

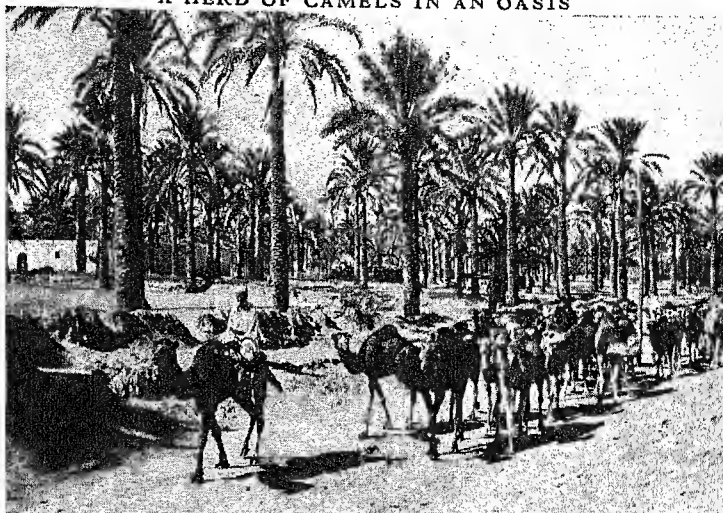
The ports of Tripoli and Bengasi, the two largest cities, were greatly improved. A naval base was established at Tobruk, which has one of the finest natural harbors on the north African coast. Bardia was made a modern town, with a good port, a radio station, and machine shops. A paved highway was built the entire length of the coast. Other roads were extended to the principal oases to the south. Airports dotted the coast and the interior.

In the second World War, Libya became a major theater of war. As Axis forces used it as a base for the invasion of Egypt, great fleets of tanks swayed back and forth over the desert like fleets of ships on the ocean. Its cities and harbors suffered terrific damage from sea and air bombardment.

Ancient Libya, a Granary of Rome

The ruins of several great ancient cities have been uncovered along the coast. Chief of these is Leptis Magna, which was one of the most beautiful of the Roman colonial cities under the Emperor Septimius Severus (see Archeology). Leptis Magna, together

A HERD OF CAMELS IN AN OASIS



Fertile oases covered with date palms offer rest and refreshment for the camels which are the chief means of transportation throughout most of Libya.

with the neighboring Sabrata and Oea (modern Tripoli), gave the country the name of Tripoli, meaning "Three Cities."

Cyrene was founded by the Greeks in the 7th century B.C., when, geographers believe, the region enjoyed considerably more rainfall than it receives today. The region was called Cyrenaica, and it became one of the great centers of Greek culture. Here the sage Aristippus founded the Cyrenaic school of philosophy, which held that "pleasure, tempered by intelligence," was the chief goal of life. At the height of its power Cyrene was a city of 100,000 inhabitants. Its splendid marble temples, baths, and cemeteries, ornamented with beautiful sculptures, have been recovered from the sands by the labors of archeologists.

Both Cyrenaica and Tripolitania passed under Egyptian rule in the 4th century B.C. and later fell to Rome. Roman Libya grew wheat enough for a large population and also exported a large amount to Rome. In the 5th century of our era Tripolitania and Cyrenaica were conquered by the Vandals, and two centuries later the country was overrun by the Arabs.

During this time the climate was becoming drier, and it attained its present state during the late Middle Ages. In 1510 Ferdinand, king of Spain, captured the city of Tripoli, and from 1530 to 1551 it was occupied by the Knights of St. John. Then the Turks seized the region and made it a pirate stronghold. In 1801 the United States fought a war with the Tripoli pirate chiefs (see Decatur, Stephen). In 1835 Turkey took firmer grip on the country, but periodic revolts continued to disturb the land until the war with Italy put an end to the Sultan's rule in 1912.

MAIN STREET OF TRIPOLI, CAPITAL OF LIBYA

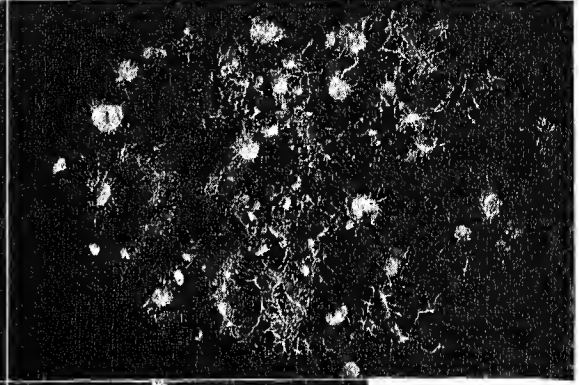
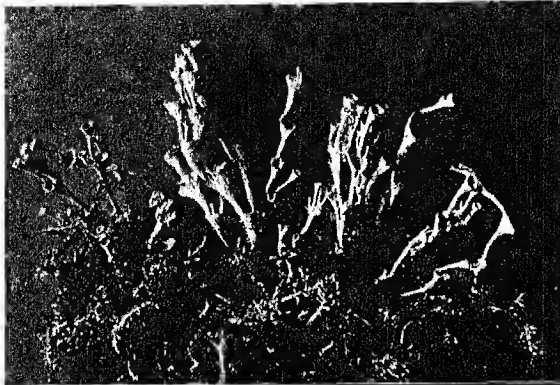


This modern Italian city, most of it built since 1923, adjoins the native city which was founded 3,000 years ago as Oea, capital of a Phoenician colony.

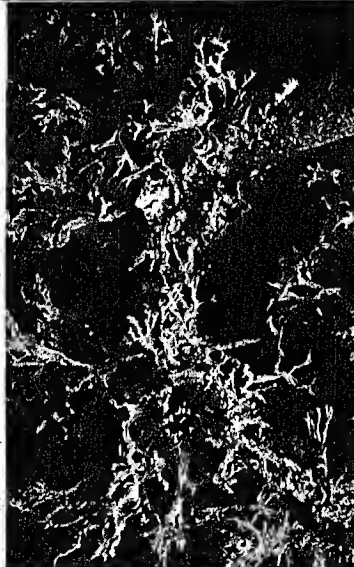
LICHENS (*li'hēns*). On tree trunks, rocks, old boards, etc., and also on the ground we often see those queer splotches of various-colored plant life which we call "lichens." They are of great scientific interest from the fact that they are not single plants, but

unable to make food for itself owing to its lack of green coloring matter, uses the food made by the alga; while on the other hand the alga is protected from drying out by living on the sponge-like network of the fungus threads. There are others who

PLANTS THAT FORM "PARTNERSHIPS"



each lichen is formed of a fungus and an alga living together so intimately as to appear like a single plant. The lichens furnish one of the best illustrations of symbiosis ("living together"), as the scientists call this intimate relation of two different kinds of organisms. The fungus makes the bulk of the body with its interwoven threads, and in the meshes of the threads live the algae. The special fungi which take part in this arrangement are almost never found growing separately, but the algae are found growing free.



Here are four specimens of Lichens, those curious "partnership" plants, each of which consists of a fungus and an alga. It is a peculiarity of the fungi, that, having no green coloring matter (chlorophyll), they are unable to manufacture their own food. So certain ones of them combine with the algae, which have the food-making power. In return the fungi shelter the algae and gather moisture for the partnership.

believe that this is a case in which the alga is not benefited by the presence of the fungus, but is held in slavery by it (*helotism*).

In any event the combination produces a structure which is able to exist where neither one could live alone. As a consequence, lichens are able to grow in the most unfavorable places. About the last plants one finds in the far north or up on a high mountain are the lichens; and they are about

Lichens have a peculiar and effective method of propagation. Upon the surface of the body there are commonly seen minute granules which give the body a dusty appearance. These granules (called *soredia*) each consist of a few cells of the alga surrounded by threads of the fungus. When these *soredia* are blown off they start new lichen bodies.

By many it is thought that the fungus and the alga are mutually helpful in this intimate relationship (*mutualism*). The claim is that the fungus, being

the first plants to be found upon rocks brought above the surface of the ocean. In such exposed situations the fungus could not live, because it depends upon other organisms; and the alga could not live, because it would be dried out speedily; but the two can live together. In this way lichens play a very important part in the first stages of soil formation on bare rocks.

Certain kinds of lichens, such as the ones called "Iceland moss" and "reindeer moss" are used as food by reindeer and even by man. Other kinds produce dyes, drugs, etc. (See *Algae*; *Fungi*; *Litmus*.)

LICORICE. The licorice drops and sticks and slender "whips" which are found in every candy store are made from the juices of a plant that grows in many warm countries. The juice is obtained from the long pliant roots which extend straight down into the ground for more than a yard. The plant is cultivated in the warmer parts of the Old World, especially Turkey, Russia, Italy, Iraq, India, and Spain. It takes three years to bring a licorice plantation into bearing. The United States imports its entire supply. Italy and Spain furnish the best grades.

Stick licorice is made by straining and concentrating the solution obtained by boiling the crushed roots. Mixed with sugar it is made into cough drops, syrups and candy, and is used to cover disagreeable taste in medicines. Licorice paste, which is largely used in tobacco manufacture, is made from the first extract of the roots; a second extract is used in certain types of fire-extinguishers. The roots remaining after extraction, are used in the manufacture of box board and insulating wall board.

There are a dozen or more varieties of licorice plants, of which *Glycyrrhiza glabra* is the most important. They are perennial herbs, 3 or 4 feet high, with fernlike leaves and flowers usually pale violet. The name comes from Greek words meaning "sweet root."

LIÉGE (*lě-āzh'*), BELGIUM. Even in the Middle Ages Liège was one of the arsenals of Europe. Knights were supplied with lances and armor from its smithies, and the popular motto, "Faithful as a dagger of Liège," attests the sound craftsmanship of its workers. Today the rich coal mines which lie in the valley of the Meuse River, on which Liège is situated, make it the chief manufacturing center of Belgium. The smoke of a thousand tall chimneys hangs over the roofs of the "Belgian Birmingham," as it is called, which like its English namesake is famous for the manufacture of cannon and firearms of every description, together with steam engines, machinery, hardware, and textiles. But amid the smoke haze of modern factories, an ancient university and many stately buildings of old and beautiful architecture remind the traveler of the earlier days of Liège.

The history of Liège (German "Lüttich") goes back to St. Monulph, who traveled through the beautiful Meuse valley in the 6th century. Greatly impressed with the beauty of the country, he stopped at the juncture of the Ourthe and Meuse rivers and said, "God has chosen this place for the salvation of many people. Here must be raised a great town." The chapel which he built was the beginning of the present city, and also of its rule by the bishop, which lasted until 1795. For many centuries the "Prince-Bishops of Liège" sat in the diets of the Holy Roman Empire, and the city was famous as a center of religion and learning long before its mineral wealth was suspected. Today Liège is the center of the Walloon culture, akin to the French. While the Burgundian dukes were ruling the Netherlands, Charles the Bold sacked the city and razed its walls in punishment for a rebellion (1467).

Ringed by forts, Liège guards the Meuse Valley route through Belgium into France. In the World War of 1914-1918 and again in 1940, it lay in the path of German advance. In the first major battle of the earlier war (Aug. 4-16, 1914), it fell after a heroic defense (see World War). During the German occupation its factories were destroyed. In May 1940 it surrendered after a brief struggle. Completion of the Albert Canal in 1939 gave the city water transportation to the sea. Population, about 167,000.

LIFE-SAVING SERVICE. The doomed vessel shudders to the awful pounding of the waves. A distress rocket tears into the sky. On the shore men in oilskins are hastily arranging lines and rigging, and elevating the muzzle of a small cannon pointed toward the ship.

"Ready!" cries the Coast Guard captain; "fire!" The cannon booms, shooting a projectile with an attached life-line across the deck of the sinking vessel. The crew seize this and haul out a cable along which runs a pulley carrying the queer-looking "breeches-buoy." This device is a large life-preserver attached to a pair of canvas trousers, with lines for hauling it to and from the vessel.

"Haul away!" commands the captain, and presently the first of the rescued persons arrives in the breeches-buoy, riding over or through the greedy waves. Thus, one by one, the ship's crew and passengers are pulled to shore—and to safety. Stirring scenes such as this are frequent in the lives of the brave men of the United States Coast Guard.

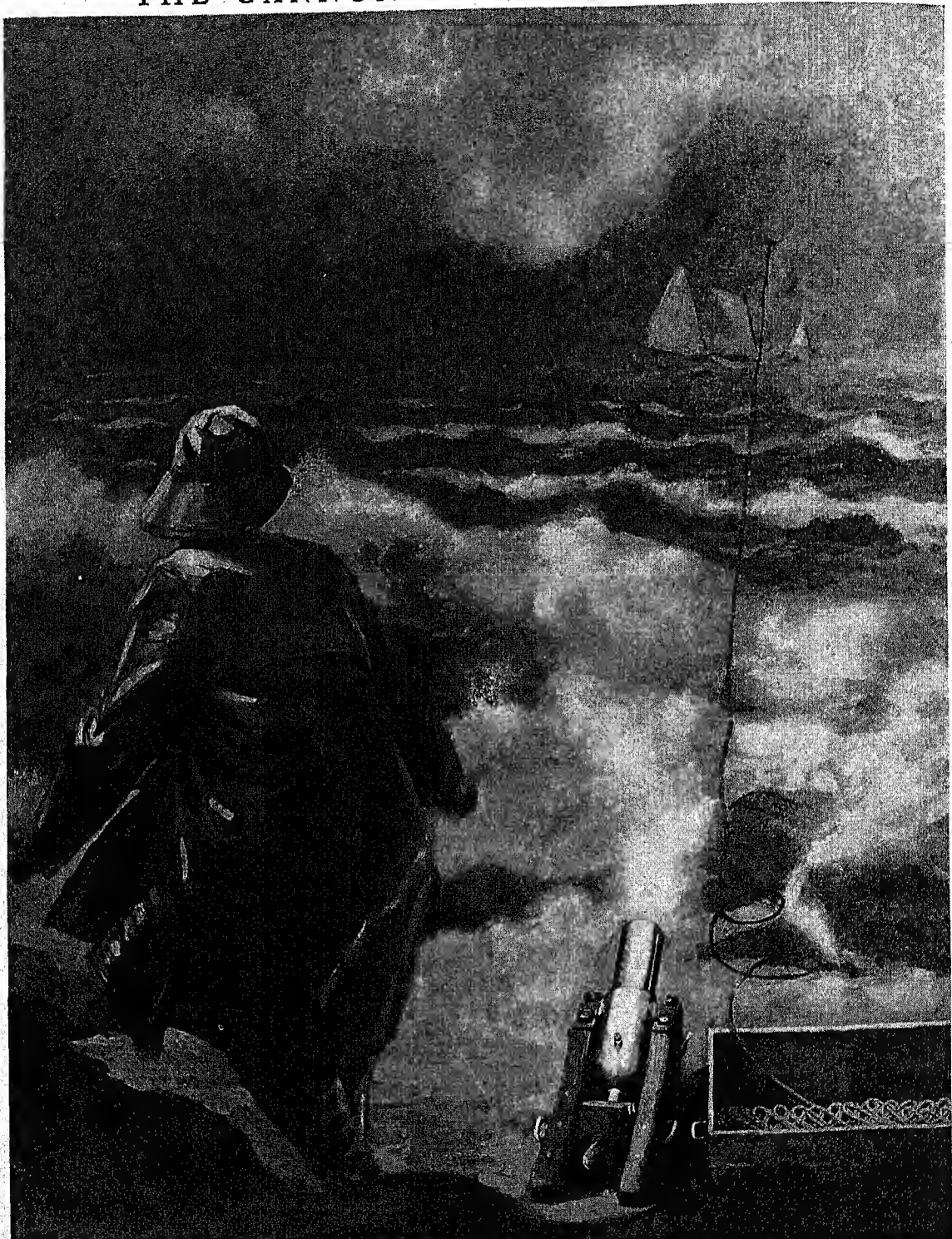
Nearly all maritime countries have life-saving stations, but the service in the United States is especially noteworthy. It dates back to 1848, and in 1915 was combined with the Revenue Cutter Service under the name of the United States Coast Guard.

Today the United States has over 200 life-saving stations along 10,000 miles of dangerous coast in 13 definite districts, including the Great Lakes. Of these, over 125 are on the Atlantic coast and the Gulf of Mexico. Each has a crew of eight or ten men who follow a rigid routine of daily drills, keep the life-boats and apparatus in constant readiness, and patrol the shore from sunset to sunrise, as well as on foggy days.

When a ship in distress is sighted, the men of the Coast Guard signal the sailors with flare rockets to show that help is at hand. Word goes out by telephone, telegraph, radio, or in addition, at night, by searchlights flashed from lookout towers, so that other stations and ships may stand by in case of need. Each station has a 26-foot self-bailing motor surf-boat, a similar boat without motive power, and other smaller boats. Some have 36-foot self-bailing and self-righting motor life-boats, equipped with automatic valves which empty water as fast as it is taken in, and are made buoyant by many small water-tight compartments.

Rescue ships and life-saving stations also use the Lyle gun, a cannon which fires a projectile carrying a

THE CANNON THAT SAVES LIVES



Most cannon are built to kill, but this one, called the Lyle gun, saves lives by shooting a life-line to ships in distress. Invented by David A. Lyle of the United States Army, it has become part of the life-saving apparatus of ships and coast stations. Fired from a rescue ship, or by a life-saving crew on shore, it sends a projectile out over the shipwrecked vessel, with a range of 400 to 700 yards. This carries a strong cord to the sailors, and an endless hawser is then sent out, attached to the lighter line. When this is made fast to the mast, crew and passengers are hauled to safety by means of a breeches-buoy or a life-car. The rope must be paid out swiftly and without knots and tangles, so it is wound on a board studded with pegs. For use the board is inverted and the rope slips off the pegs and pays out in the elaborate but smooth-running coils you see above.

light strong rope to the wrecked vessel. A heavy rope is attached to the lighter rope, and on this is rigged the breeches-buoy, which will transport one person from ship to shore, or the life-car, which will carry six or seven. In some years as many as 9,000 persons have been rescued or assisted by the Coast Guard.

Although the life saving service in the United States and Canada is maintained by the government, in most other countries it is supported by voluntary contributions. Canada has a number of government stations under the control of the Dominion Department of Transport.

WHAT SCIENTISTS KNOW of the MARVELS of LIGHT

The Swift Messenger that Travels 186,270 Miles a Second—Amazing Facts and Ingenious Theories about this Form of Energy, to which We Owe Our Very Existence

LIGHT. Light seems, and is, supremely important because it causes the sensation of sight—and sight is one of the greatest conveniences imaginable. With it we can perceive what takes place at considerable distances; light enables us to extend our contacts with our environment “as far as the eye can see.” Harnessed in ways that man has devised, it turns night into day at will; it lets people see the microscopic germs of disease, and study the nature of the stars. Through photographs and motion pictures, it lets us see what is happening in distant places on the earth.

Moreover, without light, all life on earth soon would perish for no green plants could grow. Without them, plant-eating animals could not live—and therefore meat-eating animals and man could not live. For all these reasons, light is supremely important to us, and we need to understand its workings.

Fortunately, much can be learned just by looking about, and reasoning clearly concerning what we see. Imagine, for example, that we are in an absolutely dark room, and we open the door to another room in which a bright light is burning. This light is called a *luminous source*, because it generates and emits light. As the door is opened and light falls on objects in the previously dark room, we see them. They have become illuminated sources of light, for they reflect the light falling upon them from the luminous source. There are other objects in the room; but if they lie outside the fan-shaped stream of light coming through the opened door, we do not see them.

Measuring Illumination in “Candle Power”

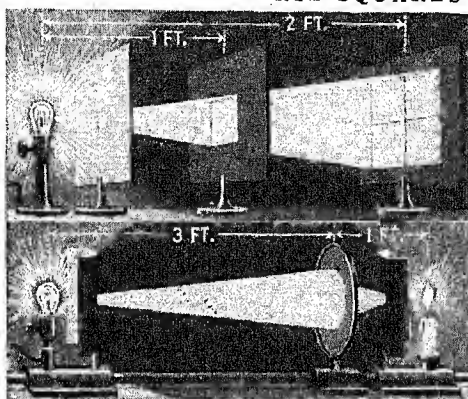
This demonstrates an important property of light—the fact that so far as our eyes can see, light travels in straight lines—a fact which in formal language is

called the *rectilinear propagation* of light. To learn a second fact about light, note that we see the nearer objects in the room more clearly than we do others farther away. At the open crack of the door the

light is strong, but as we move along the illuminated wedge of light the same amount of illumination is spread over an ever-increasing area, and the intensity of illumination is less. This lessening of intensity is expressed in the *Law of Inverse Squares*: “intensity of illumination varies inversely as the square of the distance from the source.”

The method suggested in the picture herewith not only will test this, but suggests a way to measure the intensity of illumination. To start, we adopt a standard of illumination such as the *candle power*, which is the light given by a spermaceti candle burning two grains of wax a minute. (Science now uses more exactly controllable sources of light.) The light thrown by such a candle on a curved surface having an area of one square foot, with every part of the surface one foot away from

THE LAW OF INVERSE SQUARES



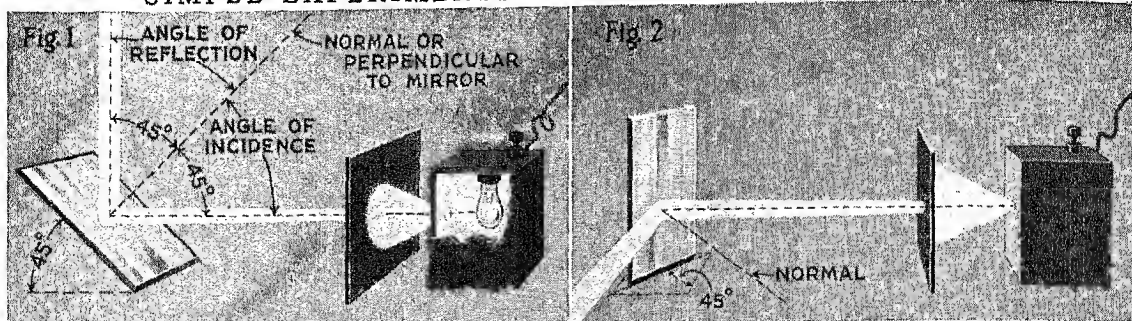
To test the law of illumination given in the text, place a light behind a screen having a square hole just large enough to illuminate one square foot on a second screen one foot from the light. Now place the second screen two feet from the light and measure the illuminated area. Since the amount of light has not changed, and now covers four times the area, the intensity of illumination on each square inch can only be one-fourth as great. That is, when the distance was multiplied by two, the intensity was divided by four (the square of two). This law can be applied with the Bunsen photometer shown in the lower picture. Oiled paper held in the ring is placed so that no light “shines through” from either side. This shows that the intensity of illumination from each lamp is the same at that point. The law of inverse squares then gives the relative intensity of the light at each one of the lamps. Here the left-hand light is nine times stronger than the right-hand one, since the distances are as 3 to 1.

the source of light, is called a *foot candle*. Another unit, the *lumen*, is (approximately) the amount of light a standard candle will throw upon any square which is placed as far from the light as one side is long. The total light from the candle is about $12\frac{1}{2}$ lumens. Making such measurements forms the work called *photometry*; the instruments used are called *photometers*.

Reflection and Diffuse Reflection

A good mirror and a “point source” of light, such as a small hole in a box containing an electric light, will reveal many facts about light. The light beam can be narrowed by using a screen with a small hole in front of the box, and the room should be dark. Black-board-eraser dust beaten out along the beam will

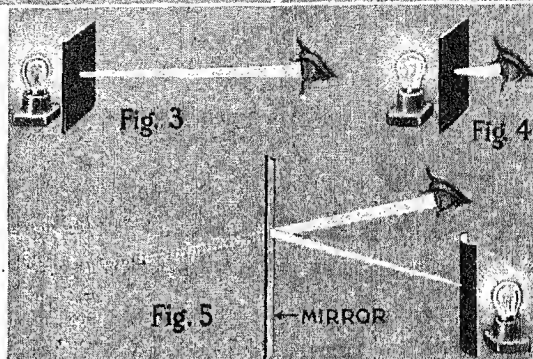
SIMPLE EXPERIMENTS THAT EXPLAIN REFLECTION



make it more visible. This method, as the accompanying picture shows, explains how *incident* and *reflected* beams, and the *normal* to the reflecting surface, together give the *Law of Reflection*: "the angle of incidence equals the angle of reflection"—a law which holds true of reflection from curved mirrors as well as flat ones, provided the normal is determined correctly (see *Mirrors*). The picture also explains the formation of *virtual* and *real* images in mirrors.

Examining the surface of a mirror shows that for reflecting purposes it is flat and continuous. Hence the entire combination of incident beams coming from a luminous or an illuminated object, retains the same relations between beams after reflection, and creates an image of the object in the eye. Rougher surfaced objects, however, act like a collection of numerous microscopic mirrors, reflecting in so many different directions that any "incident image" striking the object is broken up, and we see only the light coming from the object itself. This action is called "diffuse reflection," and it helps greatly to make the world more livable.

Thus, a room may be well illuminated even though it contains a single window facing the north, and no sunlight ever enters it. Diffuse reflection from the outside world gives it light, and moreover, acts within the room to distribute light, the rough reflecting surfaces of the walls, floor, ceiling, and the objects in the room sending the light in all directions. In the same way, diffuse reflection from dust particles, water vapor, and snow and ice crystals in the air (see *Air*)



After setting up the apparatus described in the text as shown in Fig. 1, notice the relative positions of the beam from the box to the mirror (the *incident*, or *striking*, beam) and of a reflected beam. Now imagine a perpendicular (shown by a dotted line and called a *normal*) rising from the mirror where the incident beam strikes. This line, you will see, always lies midway between the two beams, so that the angle it makes with the incident ray is equal to the angle it makes with the reflected beam. This gives us the Law of Reflection stated in the text. Fig. 2 shows the same experiment for horizontal reflection. Figs. 3 and 4 show how the eye can judge distance from the divergence of light rays. When the eye is distant from the pinhole of the screen, as in Fig. 3, only rays having a slight angle can enter the pupil of the eye. When the eye is nearer, as in Fig. 4, the angle can be greater—and the eye always sees the point as being at the apex of the angle. This explains what one "sees" in mirrors, as in Fig. 5. Here light is actually coming from the pinhole in a screen some distance in front of the mirror, but as the diverging rays enter the eye, they seem to be coming from a point as far behind the mirror as the light is in front. Applying this to every point of the light in turn shows why the eye "sees" an inverted image behind the mirror, as shown. Such an image is called a *virtual image*, because it exists only "in your mind's eye." If, however, you placed a screen where you stood and looked at it, you could see the reflected image. It is a *real image*, because it can be thrown on a screen.

scatters light even on dull days when the sun is not visible, and keeps clouds from casting dense black shadows on the earth. Men who have gone 30 to 40 thousand feet high in balloons and airplanes report that the sky appears black, stars appear, and the sun becomes a sharply defined disk. This happens because there is little or no diffuse reflection at these great heights.

How Light Is "Bent" or "Refracted"

Everyone has noticed that a spoon placed in a glass of water appears to be bent at the point where it enters the water. This is a simple example of *refraction*.

In reflection, light is "bounced back" from the reflecting surface, without penetrating it. However, if it strikes the surface of a *transparent* medium, such

as glass or clear water, it not only penetrates, but is bent in its course, through the medium. This bending constitutes *refraction*.

The principles of refraction can best be understood with the aid of a diagram, such as the one shown on the next page. How the action corresponds with scientific theories concerning the nature of light, will be told later; but the description given reveals the *Law of Refraction*, and also explains the *refractive index*.

The "Refractive Index" and "Critical Angle"

As the explanation given with the pictures may have suggested, the greater the difference in density between the two mediums concerned, the more refraction takes place. The amount can be measured by comparing the angle between the incident beam and the normal, with the angle between the normal and

the refracted beam. The ratio between the angles is the refractive index. The index varies with each combination of materials. By constructing the proper normals and applying the law of refraction, we can figure out the action of lenses (*see* Lens; Microscope; Telescope). The principles of refraction also explain the "critical angle" and "total reflection," as shown in the accompanying diagram.

The Amazing Speed of Light

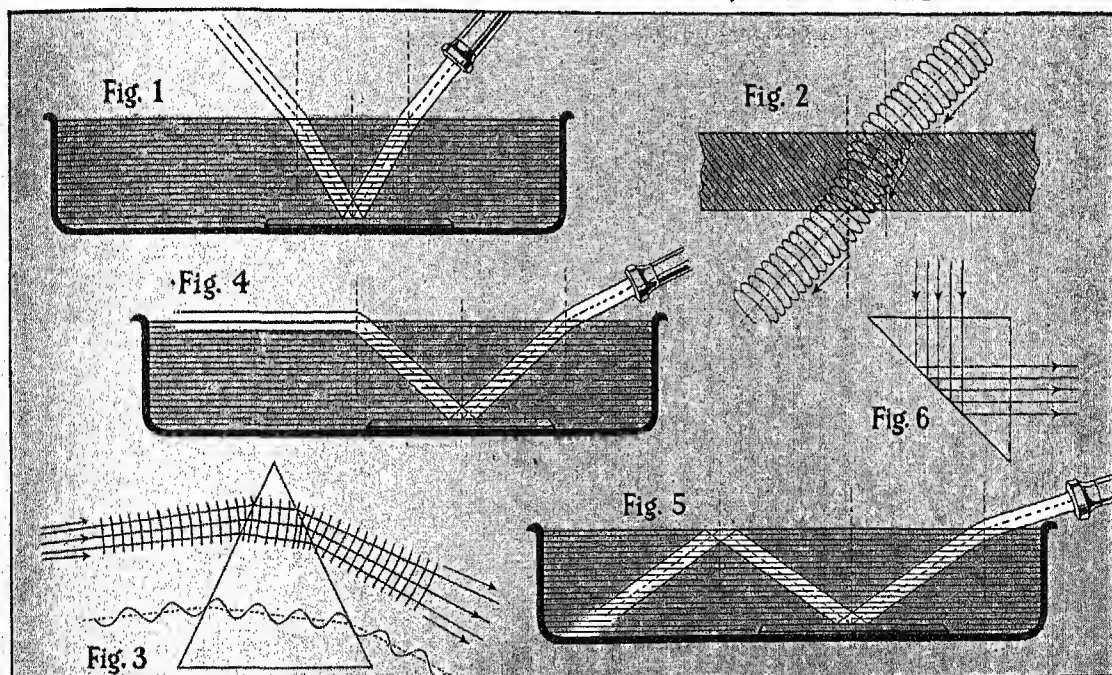
For many centuries light was thought to be instantaneous, because no experiment could time its passage. Galileo tried to measure the speed of light by having men "time" lights they flashed at each other from distant hilltops. He did not guess that in the time required for each man to act, light could travel around the world. Naturally, his experiment failed.

In 1675, thirty-three years after Galileo died, Olaus Römer, a Danish astronomer, found that an eclipse of one of Jupiter's satellites took place 996 seconds later than it would have if the earth had been on the other

side of its orbit, nearer the planet Jupiter. He thought that the delay was due to the extra distance light traveled in crossing the orbit of the earth. This distance was considered to be 186,000,000 miles; so Römer concluded that light traveled about 186,000 miles a second.

This is surprisingly close to the figure obtained by modern methods. The most accurate measurement of light speed was started by A. A. Michelson, and carried on by others after he had died. The speed as finally announced in 1936 is 186,270.75 miles a second. A surprising feature of these measurements is the fact that light seems to vary in its speed by as much as 12 miles a second, in keeping with the rise and fall of the tides, the swing of the moon around the earth, and the swing of the earth around the sun. Physicists have not decided whether these cause true variation or merely exert an influence upon the measuring devices, in accordance with relativity (*see* Einstein, Albert A.). Before his death Michelson also measured the

THE REFRACTION, OR "BENDING," OF LIGHT



Refraction can be studied easily, with a shallow water tank, such as a square-sided aquarium, a mirror, and some means for throwing a straight beam of light. First arrange as shown in Fig. 1, darken the room, and turn on the beam. Imagine a normal, or perpendicular, to the refracting surface (as the boundary between the water and air is called), and note the angles made with it by the beam before and after entering the water—also with the second normal where the beam emerges from the water after being reflected from the mirror. You will notice that the following law holds true: when the light passes from a lighter to a denser medium (as in passing from air to glass) it is bent *toward* this normal. When it passes from a denser to a lighter medium (as in passing from glass to air) it bends *away* from the normal. This is the Law of Refraction, and its

action is explained in Fig. 2. Here imagine our light ray to consist of a succession of disks, and suppose that these disks must be forced "broadside on" through any medium traversed by the ray. Remember now that light travels more slowly in denser mediums than in lighter ones. Obviously, then, when the ray strikes slantwise on the water, the portion striking first will not travel as fast as the portion still in the air. This second portion then will turn around the first, as around a pivot, until it, too, has sunk into the glass; and the "wheeling" each disk underwent on entering the glass causes the ray to travel in a new direction through the glass. Each disk in turn undergoes this deflection. When the ray emerges from the other side of the plate, and one portion of each imaginary disk begins to travel faster than the portion remaining in the glass,

the reverse action takes place. The ratio of the two angles marked is called the *refractive index* between the two materials used (being 4 to 3 for light passing from air to water). Fig. 3 shows this action as usually diagrammed, and shows why either the "corpuscular" or "wave theory" of light can explain the action, as told in the text. The straight lines represent "rays of corpuscles," while the curved ones are "waves." Note that the "rays" are always radii of the "waves." Waves may also be represented "sidewise" as shown. Fig. 4 shows the "critical angle," produced when the bending on emerging is such that the emerging ray just grazes along the water. If an even greater angle is used, as in Fig. 5, the beam is "totally reflected" back into the water. Fig. 6 shows how a glass prism (critical angle, about 42°) can act as a reflector in air.

speed of light in water and discovered it, as expected, to be only three-fourths as great as in a vacuum. (See Michelson, Albert A.)

What Is Light?

In the 17th century, Newton had formulated his *corpuscular theory* of light, which held that light was caused by minute particles or corpuseles of matter, traveling in straight lines at enormous speed. A rival theory was advanced by the Dutch physicist, Christiaan Huygens (1629-1695). He believed light to be a form of wave motion, somewhat like water waves, that occurred in a weightless, invisible medium called the "luminiferous ether."

Either theory, it happened, could explain most of the facts then known about light. Corpuscles could be expected to rebound from reflecting surfaces, as a billiard ball does from the cushion; but a wave also reflects in the same way, as you can see by noticing one strike slantwise against a breakwater, and seeing the direction taken in rebounding. Refraction also could be explained on either theory, using the imaginative disks described in the pictures on refraction to illustrate. If each "disk" be considered a corpuscle, the description of refraction given met the needs of the corpuscular theory. But disks side by side, as they would be adjoining "rays," also presented a "wave front" such as imagined by the wave theory—so again each theory scored with equal force.

"Straight line" propagation of light, however, proved a stumbling block for the wave theory. If light was waves, men argued, why does it not "turn corners," as do water waves? If light consisted of corpuscles, however, straight line propagation was easily understood—for all light striking an obstacle would be blocked, and the light not striking would continue traveling in a straight line. So Newton and

most of his successors in science believed in the corpuscular theory, until science was confronted, in 1801, with facts, discovered by Thomas Young, which this theory could not explain.

Young's Discovery of "Interference"

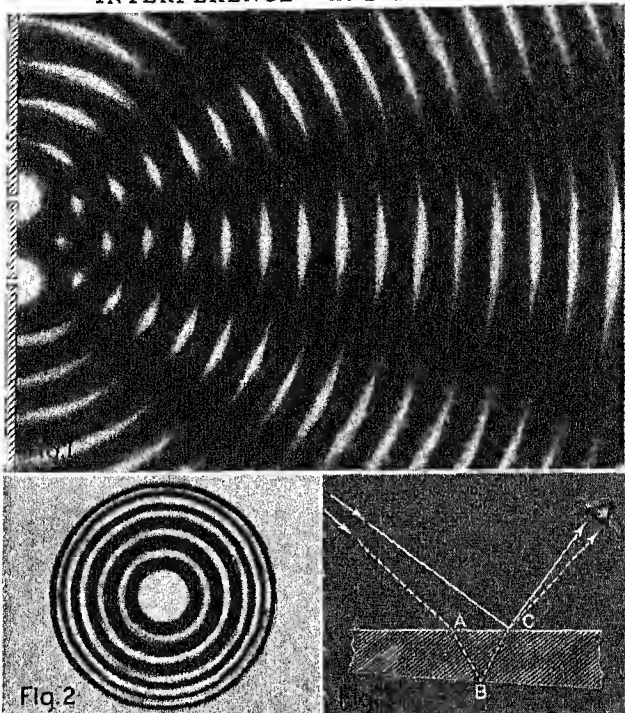
The simplest of Young's experiments consisted of placing two tiny holes close together in a screen and shining light through them onto another screen. When arranged so that the two resulting spots of light partially overlapped, tiny fringes of light and darkness

crossed the overlap. Nothing in the corpuscular theory could explain this. The wave theory, however, did so readily, as the accompanying diagram shows. At the same time, this newly discovered "interference" solved the former riddle of why light waves, if they existed, did not turn corners. Now it could be claimed that they started to do so, just as did any other wave; but, like any other wave, that portion of them starting around the corner was subject to interference. If the waves are long they can deviate from their original direction to a considerable extent before interference begins to break them up. Hence water waves and sound waves can get around corners with ease. Light waves, being immeasurably shorter than either, are subjected to interference as soon as they start to deviate from their original direction—so much so that only

delicate instruments can detect any deviation at all, and to the eye only "straight line" travel seems to exist.

Thus interference solved the wave theory's former riddle, and in turn presented the corpuscular theory with a riddle which it could not solve—so science generally swung over to belief in the wave theory. Later the wave theory ran into trouble again (see Radiation); but long before that happened, men like D. F. J. Arago (1786-1853) and Augustin Fresnel (1788-

"INTERFERENCE" AND ITS EFFECTS



The top picture illustrates Young's experiment, described in the text, which led scientists to believe in the wave theory of light. The dark lines represent the "troughs" of light waves radiating from the two pinholes at the left, the crests being between. Notice that only along three lines in the picture do "troughs" fall on "troughs" and "crests" on "crests"—so that light travels outward along these lines and can strike a screen. In between, the waves "interfere" with each other and no light passes outward. Hence alternate bands of light and darkness will strike a screen, as Young found. Fig. 2 shows "ring interference," called "Newton's Rings" from the experiment Newton made but did not explain, obtained similarly by laying a convex lens on plane glass. Fig. 3 shows the cause of iridescence, or shimmering color, as in an opal, films of oil, and certain bird feathers. If light strikes a thin, wedge-shaped film, certain rays as at A, will strike in, be reflected from the bottom of the film, as at B, and emerge, with further refraction, as at C. All rays reflecting directly from C, except those of one color, will interfere with the other ray—so only that color is seen. As the shape of the wedge, or the observer's position, changes, so does the color which "gets through." Thus the beautiful shimmering play of color is created.

1827), had used the wave theory and particularly interference to answer many hitherto vexing questions. Among these were those concerning the diffraction of light, used in the diffraction grating spectroscope, and polarized light, to be explained later. The shimmering color displayed in opals, in soap bubbles, in oil floating on water, in some bird plumage and fish scales, called *iridescence*, they explained as the product of interference, as the diagram shows. A notable application of interference was made by Michelson, when he invented his interferometer, an instrument so minutely accurate it could measure the length of a single light wave. The improved wave theory also rendered easy the explanation of color.

How Science Explains Color

Since Newton's time we have known that what we call white light is a mixture of colors, and that these colors may be separated from white light by means of a prism, and then combined again into white light (see *Spectrum and Spectroscope*). In terms of the wave theory, this is easily explained. As the article on the Spectrum tells, this theory holds that light waves are set up by the movement of electrons inside the atoms of the luminous substance, and they have different lengths, according to the type of electron movement sending them forth. When waves of a certain length strike the eye, it responds by seeing red; waves of another length cause it to see blue; and so on. (Such "one-color" rays are called *monochromatic*.) When a mixture of waves strikes the eye, it sees a mixed color—seeing green, for instance, when struck by some waves of "blue" and some of "yellow" length. White light, according to this theory, contains waves of every length visible to the eye, and the eye, responding to all of them at once, "sees white." The action of a prism in separating colors is accounted for by saying that the longer the wave-length, the less the beam is refracted in glass. (This rule is reversed in some substances.) The wave-lengths corresponding to different colors are given in the article on Radiation.

How Objects Get Their Color

We know from experience that some objects, such as mirrors, reflect light; others like window glass trans-

mit it; and opaque objects block its passage and, as we have seen, give only diffuse reflection from their surfaces. Yet a brick wall, a bound book, the body of an automobile, exhibit form and color just as do

objects seen in a mirror or through window glass. Their ability to exhibit form comes partly from the fact that diffuse reflection is sufficiently regular to help, and partly from the contrast they offer with surrounding objects. Their power to show color arises from their *selective absorption*—that is, from the fact that they absorb light waves of certain lengths, turning the energy into heat or chemical effects, and they reflect the others.

We can demonstrate this easily by placing differently colored shades over an electric light, and noticing how it affects the color of objects in the room. Suppose for this experiment we have near the light a red book, a green rug, a blue picture, and a white paper with a black spot on it. When we place a blue shade over the light, the white paper appears blue, the black spot remains black, the blue picture is blue, but the red book and the green rug appear black. With a red shade the white paper appears red, the black spot is still black, the red book remains red, while now the green rug and blue picture appear black. With a green shade, the white paper seems green, the rug remains green, but the black spot and the blue picture and red book all seem black.

From this we see that if the light is white and the object *looks* white, it has reflected *all* the light. If the light is green a white object reflects the green light and seems green; or it will

appear red when placed under red light.

The next conclusion is that black objects do not reflect any light at all. Not one of the colored lights was reflected back to us from the black spot, or the spot would have appeared to be that color. The last conclusion is that colored objects reflect only those rays of light which we say are "their color." The red book seemed red under red light as well as white light, but under green and blue lights it appeared black, for it received no red light that it could reflect. The same was true of the other objects. They showed their own color only in white light or light of their color.

SCIENCE'S IDEA OF A "LIGHT WAVE"

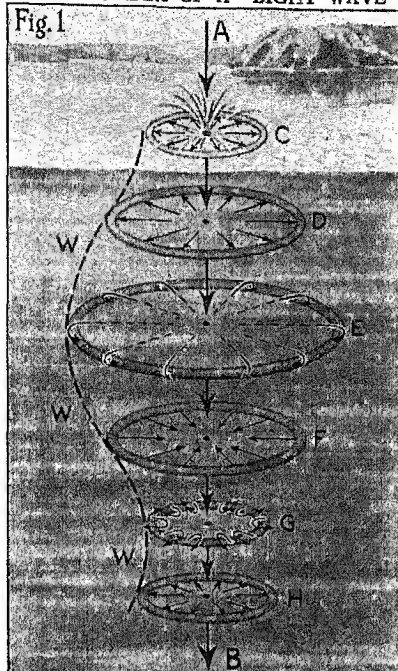


Fig. 1. To understand what science means by an electromagnetic pulse, such as a "wave-length" of light, suppose we imagine space represented by water, with a stone dropping in it, as at A. (The stone represents an electric spark, a "jumping" electron in luminous matter, or whatever causes the electromagnetic disturbance.) Now suppose that instead of the stone dropping and the ripple spreading, the stone stays in place, and the ripple C sinks along the line A-B—also that instead of expanding indefinitely, it expands for a time, then contracts, expands again, and so on, as in D, E, F, G, and H, sinking, however, all the time. Meanwhile the stone, continuing to beat against the surface, sends out additional ripples, and so a whole "train" of ripples, each alternately expanding and contracting, shoots downward along the line A-B. This is roughly how science supposes electromagnetic pulses travel through space. If now we draw a line such as W along the edge of our descending ripple, we get the familiar wavy line used in diagrams to represent a light wave, radio wave, or other electromagnetic disturbance traversing space, the "crest" being where the ripple is most expanded, and the "trough" where it is most contracted.

HOW MIRRORS CAN "ANNIHILATE" LIGHT

Fig. 1. Here we see a conventional "wave" diagram, showing two "lines" at right angles to each other, derived like line W in the picture on the preceding page. The rules of mechanics tell us that all the forces in a wave can be resolved into these two. To understand how such a wave is "polarized" by mirrors, remember that space is supposed to be capable of transmitting *transverse* vibrations—that is, waves which, as shown by the arrows, move crosswise to the direction the pulse is traveling. It is supposed, however, not to transmit *longitudinal* vibrations—that is, those moving to and fro along the direction of the motion. Now see how this wave strikes the mirror and is reflected up-

ward along the line A-B, the center of impact being at A. Remember now what was said about space being unable to transmit longitudinal vibrations, and see how this affects the reflection at A. If the "angle of incidence" is 57° (for an unsilvered mirror in air) the movements of the vertical wave would have to be reflected as longitudinal pulses. Since this is impossible, they are absorbed by the mirror along the line A-C; but the horizontally vibrating wave is reflected perfectly, as shown. Note, however, that all its vibrations are in one plane. That is, it has been "plane polarized." To the eye, this merely weakens the light—but by comparing Figs. 2 and 3, we shall see the polarization.

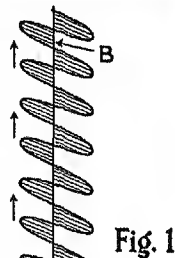


Fig. 1

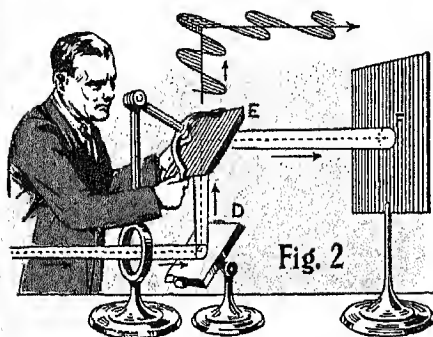


Fig. 2

Fig. 2. Here the mirror of Fig. 1 is shown at D, reflecting the polarized beam upward. Above it, at E, the experimenter has a second mirror, exactly parallel to the first, but with its reflecting surface away from him, so that the beam from D is reflected horizontally to the right, since the vibrations in the beam come transversely and can be reflected transversely, as shown in the little sketch, to strike the screen at F.

Fig. 3. Here we see the phenomenon which, by contrast with the negative result in Fig. 2, demonstrates that the light has been polarized. The observer has turned the upper mirror horizontally through 90 degrees, to the position shown. Now, as the little sketch shows, the vibrations of the polarized beam are in the same situation as were the vertical vibrations at A in Fig. 1. In order to be reflected outward along the line G-H, as the ordinary laws of reflection require, they would have to travel as longitudinal vibrations—which our assumptions tell us cannot be done. The facts bear this out, for no light is reflected—that is, this arrangement of mirrors, able in any other position to reflect light perfectly well, in this position *annihilates* the beam of light, the vibrations presumably being absorbed along the line G-J of the upper mirror. This result, which would have marked any man as a great magician in other days, is only one of many polarization effects science can obtain.

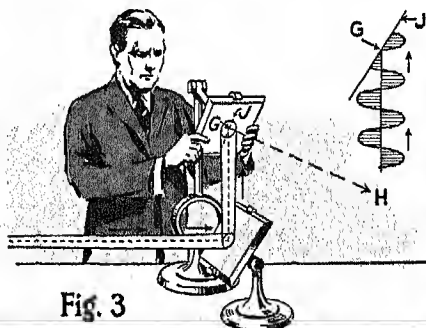


Fig. 3

The glass shade which we put upon the light had the same absorptive property as the colored objects. We did not color the light which passed through, as we could color water by adding dye to it. The glass absorbed all the rays except those of one color, which passed through, the other colors being absorbed.

The *objective* color of objects is their color in white light. The *subjective* color is the color that appears to be in given circumstances. Thus, a red book has a subjective color of black, and white paper of green, when illuminated by a green light. (See also Color.)

The Odd Nature of "Polarized Light"

One of the great triumphs of the wave theory was Fresnel's explanation of how light is polarized. This can be done with certain transparent substances such as tourmaline or Iceland spar, a transparent calcite (see Calcium), which transmit light waves so they

vibrate only in one plane. Thus, when light passes through a thin slice of tourmaline, all the vibrations are shut out except those in the direction of the crystal's axis, straight up and down for example, just as if the light had been squeezed through a narrow slit. This light ray is now *plane polarized*. If another crystal is placed back of the first, with the axes in the same direction, the light will pass through, but if the axis of the second crystal is placed at right angles to that of the first, the light will be shut off entirely, as no vibrations can pass. The same curious effect can be obtained with mirrors, as the pictures show.

Polarized light is immensely useful to chemistry and industry because many common substances *rotate* the plane of polarization, and measuring the amount of rotation reveals facts concerning the substance. Glucose, or the sugar of corn syrup, for example, is

indistinguishable chemically from fructose, or grape sugar. But a solution of glucose in water rotates the plane of polarized light to the right (and hence is called dextrose), while a solution of fructose rotates it to the left (and so is called levulose). Similar effects are given by other sugars, so measuring the rotation they produce in polarized light distinguishes them. Polarized light is used also to identify minerals, as it reveals a distinctive color pattern in each one.

Such tests are made with an instrument called a *polariscope* (or *saccharimeter*, when designed to test sugar). This contains at one end a crystal or Nicol prism (the polarizer) to polarize a beam of light, and another crystal or prism (the analyzer), through which the polarized light must pass, at the other end. So long as nothing is between the two and their optical axes are parallel, polarized light will pass through the analyzer. If now a solution, say, of sugar be placed between the two, it will rotate, or twist, the plane of the polarized light. This "twisted" light no longer can get through the analyzer, until the optical axis of the latter is brought into line with the new plane of the light. Now the light comes through; and by knowing how much he had to rotate the analyzer to bring this about, the operator knows how much rotation the solution imparted to the polarized light.

A new material called *polaroid* has many useful applications. This is a thin sheet of plastic containing microscopic crystals, all lying parallel. It allows the passage of light vibrations in only one plane, and so it is used in sunglasses, camera lenses, desk lamps, and binoculars to reduce glare.

Fluorescence of Light

Although X-rays are invisible we can "see" with them by placing an object such as a hand between the source of the X-rays and a screen of some material such as calcium sulphide. Viewed in the dark, the screen glows with a faint greenish light, and on it we see a sort of "shadow-graph" of the bones in the hand. This glowing is called *fluorescence*.

Fluorescence is a transformation of one kind of radiation—in this case, X-rays—into some form of visible light. That is, the fluorescing substance has the property of taking in electromagnetic radiation, and emitting it, transformed into a radiation of longer wave-length. This distinguishes it from phosphorescence (see Phosphorescence and Luminescence). Calcium sulphide transformed the "short-wave" X-ray energy into longer wave greenish light. Other substances transform ultra-violet radiation into visible light, quinine showing blue and chlorophyll red. Although medieval alchemists could exhibit fluorescence, it was not until 1852 that Sir G. G. Stokes (1819–1903) explained it and derived the name from fluorspar (calcium fluoride), which exhibits it. Fluorescence is

used for non-glare lighting and in making tests with ultra-violet rays (see Electric Light; Radiation).

Actinic or Chemical Effects of Light

Light possesses certain chemical properties, or *actinic effects* (sometimes called *actinism*). Since most animals and plants have always lived under light, it is not surprising that they have become able to utilize these chemical powers to perform certain of their vital processes. The best known of these, and possibly the least understood, is *photosynthesis*, by which green plants use light energy to build water and carbon dioxide into carbohydrates (see Leaves; Plant Life). The human body also relies upon certain chemical effects in which the ultra-violet rays beyond the visible spectrum play a large part (see Ultra-Violet Rays; Vitamins). The chemical effect of light upon certain metallic salts is utilized in photography and is responsible for the action of photographic films and plates (see Camera; Photography). Sunlight has a bleaching effect, known and utilized for many years, as in the manufacture of linen (see Flax).

Man's direct use of light for illumination is discussed elsewhere (see Electric Light and Power; Gas, Manufactured; Lamps and Lighting). The article on Radiation tells modern theories of light, with respect to the quantum theory.

LIGHTHOUSES AND LIGHTSHIPS. In the days when Columbus and other bold mariners set sail on uncharted seas, they were in constant peril even in European waters from shoals and submerged rocks. Today the ocean lanes are dotted with more than 13,500 lighthouses and lightships, whose powerful beacons guide the seaman; and every harbor is marked

by buoys and other signals as plainly as a city street.

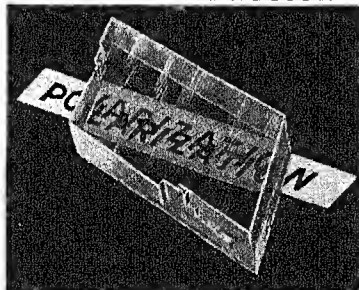
If it could only speak, the lighthouse on its perilous reef could tell many a thrilling tale of all that it has seen. Brave and skilful men have laid its foundations, sometimes working on half-submerged ledges buffeted by the waves, sometimes in caissons boring deep through the sand to bed rock.

The history of the lighthouse is alive with the tales of heroism of brave keepers, who in the face of countless storm perils, shifting sands, explosions, terrific gales, and the devouring action of the sea, have

pluckily performed their duty of guiding ships safely to port. One classic example is that of Grace Darling (1815–1842) daughter of an English lighthouse keeper, who with her father rescued nine exhausted survivors of the *Forfarshire*, after hours of struggle in a hurricane. Another story, equally heroic, is that of the old woman tender on Angel Island in San Francisco Bay, who when the fog signal was disabled, stood on an exposed platform for 24 hours, striking the bell.

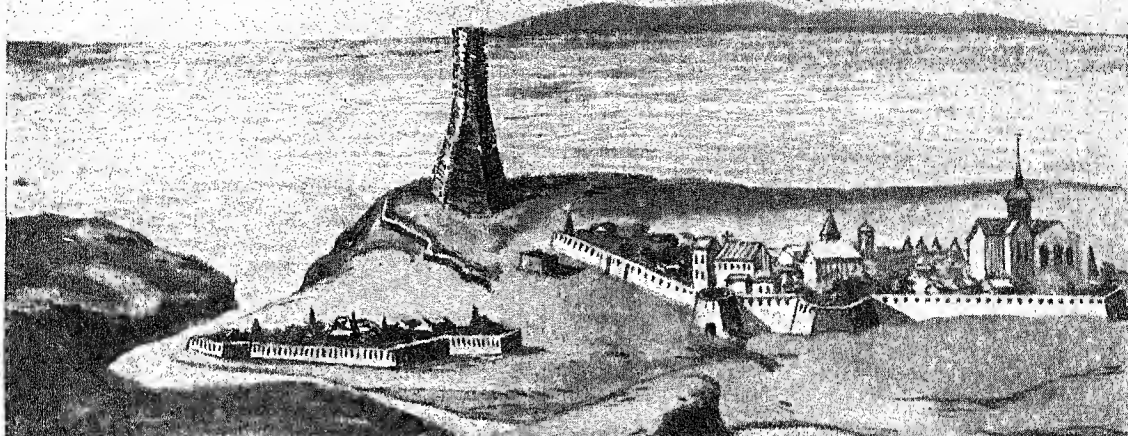
Most modern lighthouses are equipped with automatic lights, and are visited only at rare intervals by a tender. The modern keepers, therefore, must combine a thorough technical training with the old virtues of courage and reliability. They must know the Diesel engine, used to generate current for light and power; the air compressors for vapor lamps; and the use of radio beacon transmitters (see Radio).

DOUBLE REFRACTION



Polarized light is responsible for this effect, exhibited by Iceland spar and other substances. The crystalline structure polarizes the light, then refracts each plane of polarized light differently, giving the double image shown.

A GUIDE FOR SHIPS IN OLDEN DAYS



Crude as it appears to us, this lighthouse did its work faithfully at Boulogne in France for 1,400 years after it was built by the Romans. Its powerful flashing lights we use were unknown in those days, of course, and the warning light was furnished by bonfires, but even such a signal was a tremendous improvement upon groping blindly through a stormy night. The picture is taken from an old print of the famous structure.

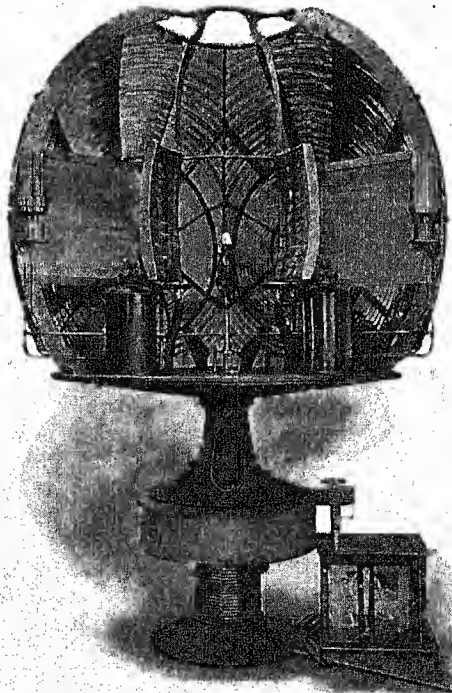
Until recent years lighthouses were huge piles of masonry of great thickness to withstand the buffeting of wave and wind. Today the typical lighthouse is a tapering cylindrical steel tower from 100 to 400 feet high, bolted into the solid rock of a reef or into a masonry foundation. A winding staircase within leads up to the gigantic lantern at the top, whose blinding shaft of light may be seen from the deck of a vessel 20 miles away or more at sea.

The lantern consists of from two to eight lenses held by a light metallic frame, with reflectors, lenses, and prisms which concentrate the light and throw it out. It is usually set in a revolving carriage moved by clockwork, so as to show a regular series of flashes by which one lighthouse may be distinguished from another. The light itself, which in olden days was made by means of coal fires, candles, and whale oil lamps, is today produced by big lamps burning vaporized kerosene, by acetylene, or by electricity.

In the earliest lighthouses, centuries before the Christian era, the light came

from a brazier of burning coals hung from a pole. As far back as the 7th century B.C. there was a lighthouse at Cape Sigeum on the Asiatic side of the Dardanelles. The most famous lighthouse of

THE MODERN "LANTERN"



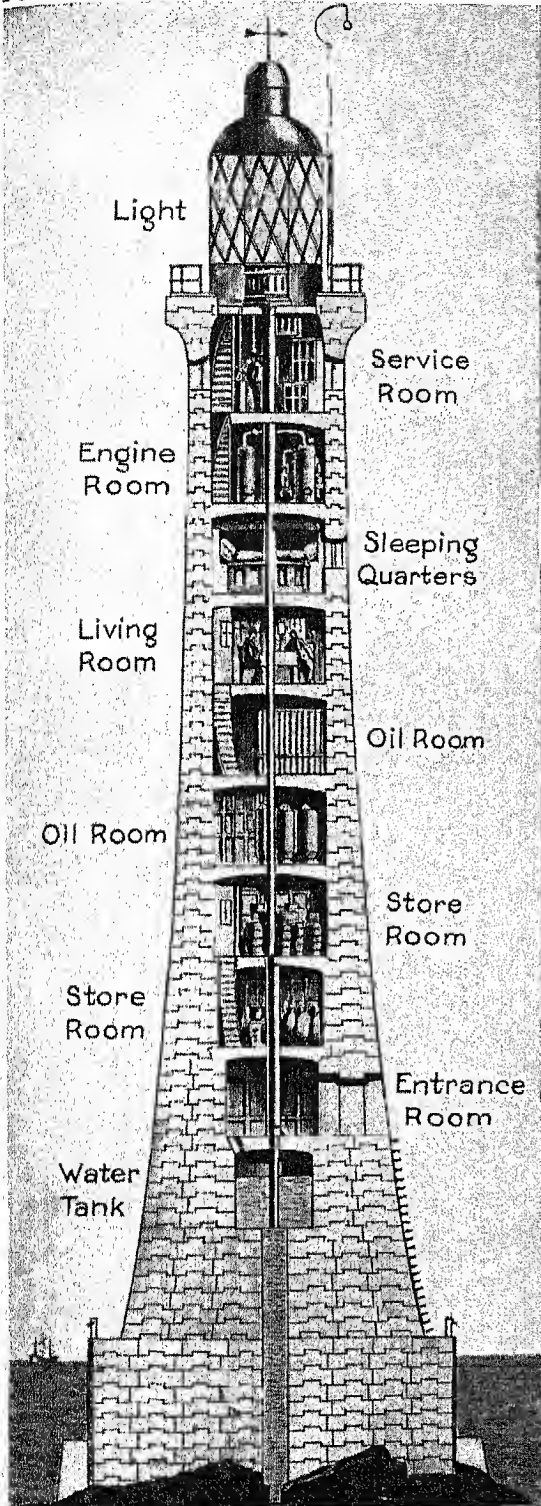
The light comes from that little acetylene-burning gas mantle in the center. Its rays are caught up and magnified by the complicated system of reflectors and lenses at the sides and shot out in horizontal beams, visible at great distances. At the lower right hand side you can see the clock-work which revolves the lantern so that its beams can be seen at regular intervals, thus enabling pilots to identify the lighthouse.

antiquity was the tower built on the island of Pharos in the bay of Alexandria in the 3d century B.C. This was considered one of the Seven Wonders of the World, and for a long time the name "pharos" was given to all lighthouses. At Boulogne, on the French side of the English channel, the Romans built a great tower 192 feet around and 200 feet high, which guided mariners for more than 14 centuries.

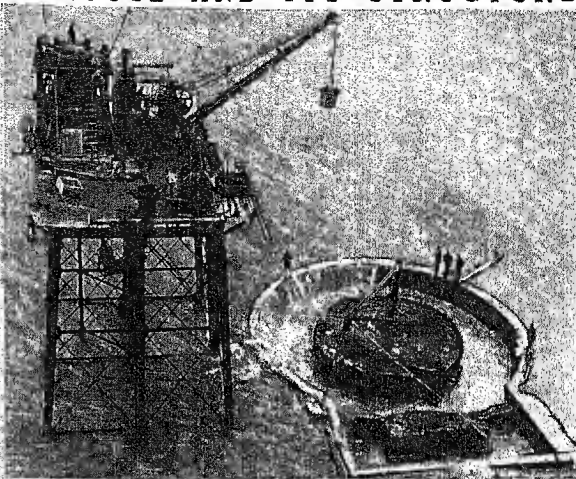
Among the most famous lights of today are the Eddystone, 13 miles off Plymouth, England, which has been rebuilt three times since 1698; the Bell Rock, off the coast of Scotland; and Minot's Ledge. The last—one of the most difficult engineering works of the world—is a dangerously placed lighthouse 20 miles southeast of Boston (see Boston).

Off dangerous coasts and at the entrance to harbors where lighthouses cannot be built, strong steel lightships

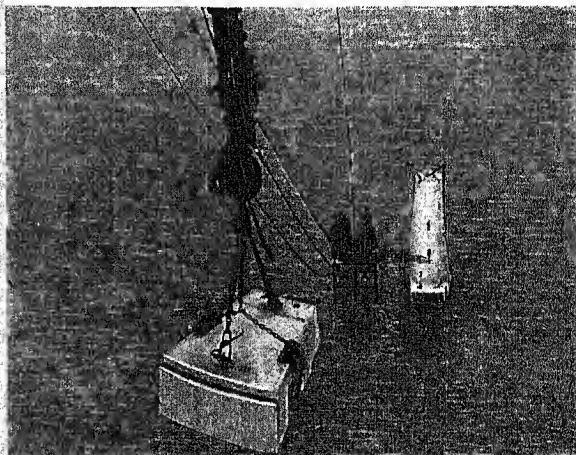
THE BIRTH OF A MODERN LIGHTHOUSE AND ITS STRUCTURE



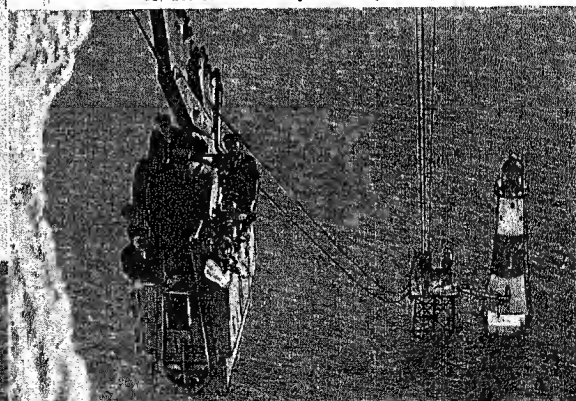
INTERIOR PLAN OF A LIGHTHOUSE. This shows you how a modern lighthouse of the stone masonry type is built. Notice how heavy the walls are at the bottom where they have to withstand the heaviest shocks.



LAYING THE FOUNDATION. This part of the work often has to be conducted from a temporary stage set up beside the lighthouse site. When the seas are rough, this work is extremely dangerous.

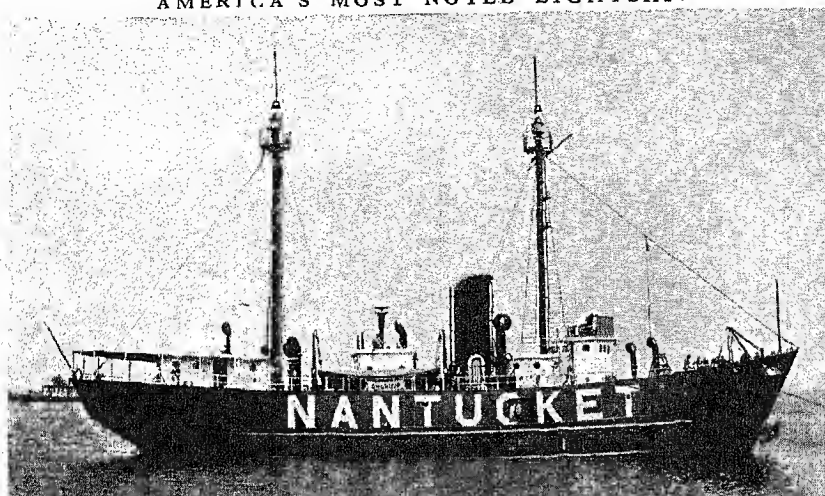


DELIVERING MATERIALS. Building materials for the lighthouse sometimes have to be delivered along cables, strung like giant spiders' webs from nearby cliffs. Here we see a great block of stone on its perilous journey.



A THRILLING TRIP TO WORK. Workmen as well as materials must make that dizzy trip along the cables, when such lighthouses as the Beachey Head light on the southern coast of England are being erected.

AMERICA'S MOST NOTED LIGHTSHIP



On voyages between New York and northern Europe, navigators are careful to keep clear of this vessel, the famous Nantucket lightship, which lies at anchor, year in and year out, on the dangerous New South Shoal, 40 miles off Nantucket. Note its sturdy lines, like those of a whaleboat, which enable it to ride out any storm. This ship is a monument to the dangers of this service, for it went into duty in 1936 to replace an older ship which had been rammed and sunk by the steamship *Olympic* in 1934, with the loss of seven members of its crew of eleven.

are moored. These vessels have one or two stout masts bearing lights. They also have fog horns and some have radio beacons and submarine sound signals to give warning in foggy or stormy weather. Each ship carries several men, who are relieved from time to time by a tender. The United States maintains more than 30 lightships on stations, with others available for relief and in reserve.

Other navigation aids such as buoys mark channels and minor obstructions. Channels are marked on the right, as ships come in, by red buoys of conical shape, called "nuns"; black "cans," or square-topped buoys, mark the left edge.

Many buoys bear flashing red or white lights. Some have bells or whistles to give warnings during fogs or snows. Acetylene or electric storage batteries provide the illumination, and a photoelectric cell turns the light off during the day. Such buoys can be left untended for months.

The United States maintains about 30,000 aids to navigation on the seacoasts, the Great Lakes, inland rivers, in Alaska, and the island possessions. These aids are in charge of the Coast Guard in the Treasury Department, which in 1939 took over the duties of the Bureau of Lighthouses. In Canada the director of marine services has charge of coast lighting.

LIGHTNING. In ancient days, men believed that lightning was a bolt of fire hurled at the earth by an angry god—and indeed, when we see the sky filled with blinding flashes, and hear the crash and roll of thunder, we can readily understand how they came to entertain this belief.

Modern science, however, has dispelled the mystery. We know now that lightning is caused by electric charges, generated upon countless water drops when air currents churn them about inside a thundercloud.

The process resembles the common experiment (described in the article on Electricity) which produces "opposite" charges of positive and negative electricity by rubbing certain objects together. Such charges, once they have been set up, attract one another. If they are strong enough, they break down the resistance of the intervening air, and rush together. Then we see an electric spark or flash. Lightning is such a flash on a gigantic scale.

Though scientists do not agree on details, they know that when air moisture condenses to water drops, the drops have negative charges on their

surface and positive charges at the center. As winds within the cloud tear fine spray from these drops, the spray carries the negative charge, leaving a positive charge behind in the larger drops. These fall of their own weight or are drawn to the lower part of the cloud by the usual negative charge on the earth's surface, and the negatively charged spray is driven upward (see Storms).

The separate charges grow stronger and stronger as the churning of water drops continues, until they break down the air resistance and cause a flash of lightning in the clouds. Lightning between clouds and earth occurs in two ways. The breakdown may take place between the negative charge on the earth and the positive charge in the base of a cloud. Or the positive part of the cloud may pass by without a discharge, trailing the negative part behind. Thereupon the charge on the earth beneath this trailing cloud turns to positive by induction; and the breakdown takes place in the opposite direction.

Why We See and Hear Lightning

Whatever may be its cause, the electrical discharge makes the air molecules along its path glow in a manner similar to the glow in a neon tube. This is what we see when lightning flashes.

The accompanying thunder is not caused by air "rushing into a vacuum" created by the flash, as used to be supposed. More probably, the flash heats the air until it "explodes." Echoes from clouds add the "roll." Many people dread thunder even more than lightning, but the flash is over by the time we hear the thunder. The article on Sound explains how thunder enables us to tell how far away lightning flashes are. The destructive power of lightning is due to the tremendous energy involved. A single flash may use 50 million kilowatts.

TERRIFIC FLAMES THAT LIGHT THE SKY

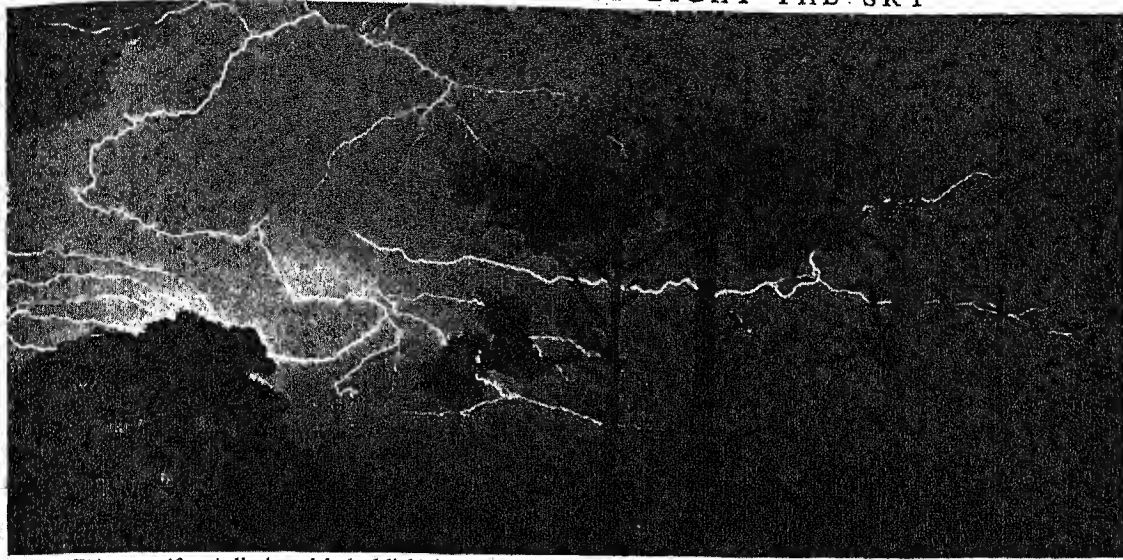


Fig. 1. This magnificent display of forked lightning may, for the moment it lasts, use twice as much energy as can be generated in all the electric power-houses of the United States. Part of the branching is to the ground, and the rest is between clouds.

In an average year, lightning kills some 400 people and causes some 20 million dollars' worth of damage in the United States. Most of this loss of life could be avoided by obeying a few simple rules. Lightning, we know, seeks the shortest path between its parent cloud and the ground. Church steeples, flagpoles, and lone trees provide a short path, and lightning tends to strike them. Hence we should stay away from them during thunderstorms. Persons on mountain tops or on level plains should lie down. People inside buildings are relatively safe, for lightning usually travels down the outside of a building or along water pipes or other metal paths. Steel-framed skyscrapers are especially safe, for they act as giant lightning rods.

Why Lightning Rods Give Protection

The lightning rod, invented by Benjamin Franklin, is a metal wire or rod having its tip well above the protected structure, and its base in the ground. The rod does not protect, however, by "providing a path to the ground" for lightning, as we used to suppose. It is the point that provides the protection. Electric charges leak readily from points; so when induction from an overhead cloud builds up a charge upon a building, some of the charge leaks, causing a feathery "brush discharge." This weakens the attractive force between the ground and cloud charges.

To insure protection, lightning rods should be installed by experts. Structures such as oil tanks which are likely to take fire are protected best by a series of rods, connected with wires to form a sort of cage. A good rod protects a horizontal width of from two to four times its height.

Various Types of Discharges

Powerful branched flashes (Fig. 1) are called *chain* or *forked* lightning. The *St. Elmo's fire* seen on ships as a glow in the rigging is a leakage, or brush dis-

charge, from sharp points. *Sheet* or *heat* lightning results from a discharge inside a cloud, or is a reflection from clouds of a distant flash. The rare *ball* lightning is seen as a ball of fire which rolls over the ground and explodes. Its cause is not known.

Scientific Studies of Lightning

Many details about lightning still puzzle scientists; but a powerful aid in clearing up these puzzles has been developed in the "lightning camera." In the type of camera devised by Sir Charles V. Boys, lenses at opposite ends of a whirling disk make pictures of the flash. In each picture, successive parts of the flash lag behind the position they would occupy if the lenses were stationary. When the pictures are placed side by side, as shown in Fig. 2, the lag causes the two images to spread apart as the flash develops.

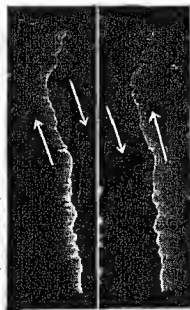


Fig. 2. A Stroke

Such pictures, taken by B. F. Schonland and H. Collens in 1933, showed that most flashes are preceded by a faint "leader stroke" from the cloud to the ground. When the leader reaches the ground, the main flash starts upward. Scientists hope that this discovery may point the way to developing a complete explanation of electricity.

Until some better explanation appears, our best theory of lightning is the one devised by Dr. G. C. Simpson of the British Meteorological Office. Simpson explains the development of charges in clouds by saying that the rising spray carries a mass of free electrons, which make the negative charge. These electrons are torn from water drops, and the drops are left with positive charge. To explain the flash, Simpson used N. E. Dorsey's idea, announced in 1926, of an "electron dart." A downward moving dart would be a swarm of electrons drawn from a cloud by a positive charge on the ground. This dart is supposed to knock electrons out of any air molecules it encounters, thus ionizing them by leaving them with positive charge. This ionized air glows, giving off the light which we see as a flash. The "leader stroke" therefore marks the passage of the dart. The dart moves faster and faster as it approaches the

ground, and gathers more electrons. Therefore the ionization effect is most intense when the dart strikes the ground, and an intense glow is caused at the point struck. But passage of the dart has opened a completely ionized path down which more electrons can swarm. As more and more of them come, ionization intense enough to cause a strong glow occurs farther and farther from the cloud, and a "main stroke," or bright flash strikes upward.

The zigzag path of lightning is caused by the dart seeking the most easily ionized parts of the air; branching occurs when several equally good paths open before the dart. Several main strokes, or flashes, may occur, due to successive discharges of electrons; such flashes may last as long as a second. Leaders usually cover a path at about 7,000 miles a second; main strokes develop nearly five times as fast.

Experiments indicate that lightning can occur when the voltage between opposite charges amounts to about 6800 volts for every inch of distance between the charges. This is about one-tenth the voltage required to produce a spark in absolutely dry air; but billions of volts still will be required to produce a flash several miles long. The actual amount of electricity in a strong flash varies between 10 to 50 coulombs, and averages perhaps 20 coulombs.

LILAC. Each spring the lilacs, with their wealth of fragrant pinkish purple or delicate white blossoms, aid in giving a festive air to the lawns and parks of the north temperate countries. This shrub, a native of eastern Europe and Asia, was brought by European colonists to America, for use as massed shrubbery or in hedges. It can grow into a single treelike bush, from 10 to 25 feet high. The shrub is hardy, grows rapidly, and flowers profusely; but it may become choked with suckers at the base unless they are kept cut away. These suckers can be planted elsewhere as a means of starting new bushes.

Family name, *Oleaceae*; genus, *Syringa* (meaning pipe or tube, and applied because lilac stems once were used as pipestems). Among American species are the common lilac (*Syringa vulgaris*) with purple flowers; and the Persian lilac (*Syringa persica*), a smaller shrub with white flowers. Cultivation often produces beautiful double varieties. Leaves, opposite; flowers, large erect panicles of small flowers having a bell-shaped calyx, a 4-lobed cylindrical corolla, and 2 stamens attached to the mouth of the tube.

LILLE (*lèl*), FRANCE. In the Middle Ages, Lille, the largest city of northern France, grew up about a feudal castle on the Deule River, seven miles from the present Belgian frontier. Today it is noted for its textile and iron manufactures, its Palais des Beaux Arts, which has one of the richest picture galleries in France, and its library with thousands of rare editions and valuable historical documents.

For centuries Lille has been noted for the making of fine linen, linen and damask cloths, and flax thread for lace-making and for sewing; "lisle" thread indeed gets its name from the city. Cotton manufactures are also important as is the making of ribbons and velvet. The city also has locomotive and bridge building works, and manufactures beet sugar, chemicals, tobacco, soap, etc. Among its educational institutions

is Lille University where the great Louis Pasteur was teaching when he did so much to revolutionize science and to aid agriculture.

Lille's history has been stormy. A leading city of medieval Flanders, it was ruined and rebuilt in the wars between the Flemish and the French in the 13th century. Later it fell under Austrian rule, then Spanish, and was not restored to France till 1667. In the War of the Spanish Succession it was taken by England and its allies but was returned to France by the Treaty of Utrecht (1713). In 1792 it successfully withstood a nine-day Austrian bombardment.

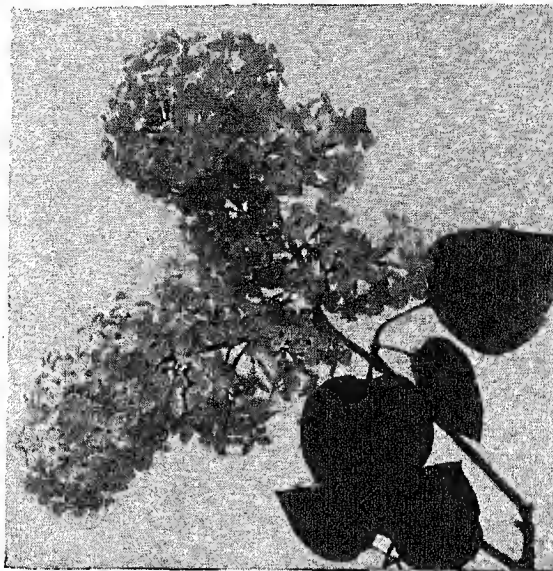
In the world wars of the

20th century it was twice seized by Germany. As a key city of German-occupied France in the second World War, it was bombed by the British air force. Population, about 200,000.

LILY. The white lily stands for purity, and artists for centuries have pictured the angel Gabriel coming to the Virgin Mary with a spray of lilies in his hand, to announce that she is to be the mother of the Christ-child. The lily is also the sign of the Resurrection and as such is the Easter flower. In Bermuda great fields of shining lilies are grown for shipment to the United States to adorn our churches at Easter time. In vivid contrast to the fair white lilies are the many brightly colored varieties, more gorgeously arrayed in their vivid crimson, scarlet, orange, or golden tints than "Solomon in all his glory."

The several hundred species of lilies grow only in the Northern Hemisphere, and most of them are confined to the temperate zone. Most popular of all is the lovely white Madonna lily, which grows wild in southern Europe and is hardy enough to thrive in the gardens of this country. This was long used as the Easter lily, but since its flowers often failed to appear in time for Easter, its place has been taken by the Bermuda lily. This can be relied on to bloom early in the spring in its native island or in hothouses in the colder climates of Europe and America.

THE LILAC'S CLUSTERED BLOSSOMS



The lilac combines its blossoms into clusters so that they may attract insects more effectively.

Among the commoner varieties of colored lilies are the tiger lily, a native of Japan, which bears dark-red purplish-spotted flowers; the Siberian coral lily, which has brilliant scarlet flowers; the gold-banded or Japan lily, with yellow-banded purple-spotted white flowers; and the showy lily, also a Japanese species, with red-dotted pinkish flowers. The giant lily of India, which has huge funnel-shaped purple-stained flowers, grows from 10 to 14 feet high, while the other species range from 2 to 5 feet. Wild lilies of the United States are the orange-red Turk's cap, the wild yellow lily, and the southern red lily.

The lily family (*Liliaceae*) is one of the most important groups of plants, since so many of its members, including asparagus, onion, leek, garlic, chives, etc., are used for food. Some of the garden flowers of this family are the lily of the valley, tulip, hyacinth, and tuberose.

The lily genus (*Lilium*) is marked by an erect stem, narrow sessile leaves, alternate, scattered, or whorled, and large showy bell-shaped or trumpet-shaped 6-parted flowers, enclosing 6 stamens and a seed-vessel. The beautiful white calla lily or arum lily (*Richardia aethiopica*) with its brilliant yellow spadix, belongs to an entirely unrelated genus. Many other so-called lilies, as the belladonna lily, belong to the Iris or Amaryllis groups. Scientific name of the Madonna lily, *Lilium candidum*; of Bermuda or Easter lily, *Lilium longiflorum*.

LILY OF THE VALLEY. Nestling among the broad cool leaves, the dainty white bells of the lily of the valley sway back and forth, wafting to the breezes their delicate perfume. This well known plant is native to Europe, Asia, and America, growing in shady damp spots and blossoming in the spring months. The smooth, linear-shaped leaves rise directly from the roots and in their midst the 6-toothed bells nod on their slender green stems. There are few plants more satisfactory than the lily of the valley. It is cultivated in hot-houses throughout the year, and when planted in our gardens, it soon escapes and runs wild along shady roadsides, its graceful "bells" nodding in the breeze. Scientific name, *Convallaria majalis*.

LIMA, PERU. In Lima, the magnificent capital city of Peru, a rain storm is as much feared as an earthquake. For the houses, with walls of adobe four to six feet thick, are almost earthquake proof, and rarely take fire, but a heavy deluge would reduce most of

the town to a mud heap. It is fortunate indeed that almost from year's end to year's end the city is without rain.

There are several handsome promenades in the city, and numerous public squares. On one stands the cathedral—the finest of the 70 churches in Lima, and one of the most noteworthy in Spanish America—with a beautiful Moorish facade and two lofty towers. The larger houses are made picturesque by lattice-inclosed balconies from whose shelter the women look out on the busy street life. The roofs are always flat, and since there are no gardens and few backyards they are used by the common people as barnyards. In

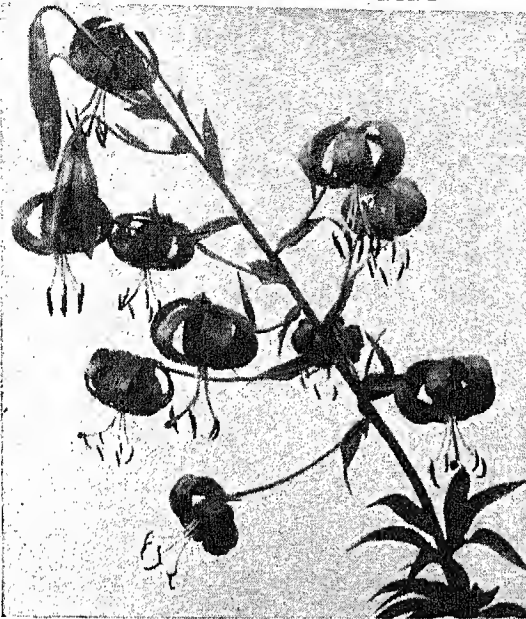
some cases a cow may spend all her life on the roof of her owner's residence.

Lima lies in a broad valley, six miles east of Callao, its port, with which it is connected by two railroads.

Earthquakes have been frequent and disastrous, and the dense fogs which prevail in winter render the climate uncomfortable and at times unhealthy. In the city is the national university of San Marcos—the oldest in South America—which received its charter from Emperor Charles V in 1551. The city was founded in 1535 by Pizarro, the conqueror of Peru, whose remains lie in the crypt below the cathedral. Under Spanish rule Lima was the principal city of South America. During the Chilean occupation in 1881-83 many of its ancient monuments were destroyed. The manufacture of cotton and woolen textiles, sugar, chocolate, cigars, and

cigarettes, etc., is becoming increasingly important. The name "Lima" is a corrupted pronunciation of "Rimac," the name of the river on which the city is situated. This river provides Lima with an exceptionally fine water supply. Population, about 285,000.

THE "TURK'S CAP" LILY



This orange-red flower is one of the common wild lilies of the United States.

THE LILY OF THE VALLEY



LIME. When we speak of lime, we commonly mean quicklime. This is a white alkaline substance having considerable power to corrode, or "eat," animal tissues. Quicklime is usually obtained by roasting limestone in a kiln or furnace at about 1800° F. This changes the calcium carbonate of limestone (*see* Limestone) to calcium oxide (CaO), or quicklime. Since quicklime is alkaline and chemically active, it is useful in many processes such as removing hair from hides and correcting acidity in soils and various liquids such as sugar-cane juice. Another common use is in mortar and plaster making.

To make mortar, lime is *slaked* by adding water. This changes the oxide to a hydroxide (CaOH). Coarse sand, cinders, or pulverized stone is mixed in, and the mixture is used to bind or cover bricks or stones. As the mixture dries, it absorbs carbon dioxide from the air to form calcium carbonate, and also combines with the silica of the sand to form calcium silicate. These substances bind the bricks or stones together. Quicklime exposed to air is ruined for mortar making, by absorption of carbon dioxide (air-slaking). Lime plaster is made by mixing hair with water-slaked lime.

Pure calcium oxide is formed by melting limestone in an electric furnace. Under intense heat this gives a strong white light. Lime lights (also called calcium lights or Drummond lights) were formerly used for stage lighting.

A solution of calcium hydroxide in water is called *limewater*. This is used in medicine to correct acidity, to prevent milk from curdling in large lumps, and with certain oils as a liniment for burns. Limewater reveals the presence of carbon dioxide by becoming cloudy. It is an antidote for poisoning by mineral or oxalic acids.

LIMERICKS. Rudyard Kipling has given us the following specimen of nonsense verse called a limerick:

There was a small boy of Quebec,
Who was buried in snow to his neck;
When they said, "Are you friz?"
He replied, "Yes I is—
But we don't call this cold in Quebec."

Limericks became popular after Edward Lear, an English artist, published (1846) a collection he had written to amuse young friends. Writing limericks is still a favorite diversion, especially for newspaper contests. In such contests four lines are given, and a prize is offered for the best fifth line.

The limerick verse form originated, it is said, at Irish parties. Each guest would make up a line of nonsense verse in this meter; then the whole company joined in a chorus with the words, "Will you come up to Limerick?" Limerick is the chief port on the west coast of Ireland.

LIMESTONE. Without help from chemistry and the microscope we might find it hard to believe that the rock called limestone came from sea shells and corals. But chemistry tells us that shells and corals owe their stiffness to calcium carbonate (CaCO₃), of-

ten called "carbonate of lime." Limestone also is mainly calcium carbonate; and the microscope enables us to see the remains of animals which formed it.

Hence we know that limestone is sedimentary rock, formed from shells and other "limey" material in the oceans that in past ages covered the limestone regions. Outstanding regions of this sort in the United States are the present site of the Rocky Mountains, the valleys of the Mississippi, Ohio, and St. Lawrence rivers, and much of Texas (*see* Geology).

Limestone is one of our most useful rocks. It is our chief source of lime; it is used in making portland cement (*see* Cement) and in smelting iron and lead (*see* Iron and Steel); and it is one of our important building materials. Architects like to use it because it wears better than sandstone, it can be shaped more easily than granite, and it weathers from nearly white to a beautiful gray. Oolitic limestone, quarried at Bedford, Ind., and elsewhere, is particularly fine building stone because of its texture resembling fish-eggs (hence the name *oolitic*, from the Greek word for eggs).

Crushed limestone is used on macadam roads. Farmers use ground limestone to neutralize soil acids that attack calcium and other salts needed by plants. Such protection is given naturally when soils have a limestone foundation.

Travertine limestone and calcareous tufa consist of calcium carbonate deposited from hard water. Stalactites and stalagmites in caves are formed in the same way. Limestone rock is often riddled with caves because water and carbon dioxide dissolve the limestone. Chalk is a soft white limestone containing the shells of foraminifera (*see* Chalk). Marble is a metamorphic, or transformed, limestone crystallized by pressure and perhaps heat (*see* Marble).

LIME TREE. No flavor is more acceptable in a cooling drink on a hot day than a dash of lime juice. This comes from a fruit like a small, green lemon. Limes are smaller and rounder than lemons, and have a thinner rind and more sharply acid juice.

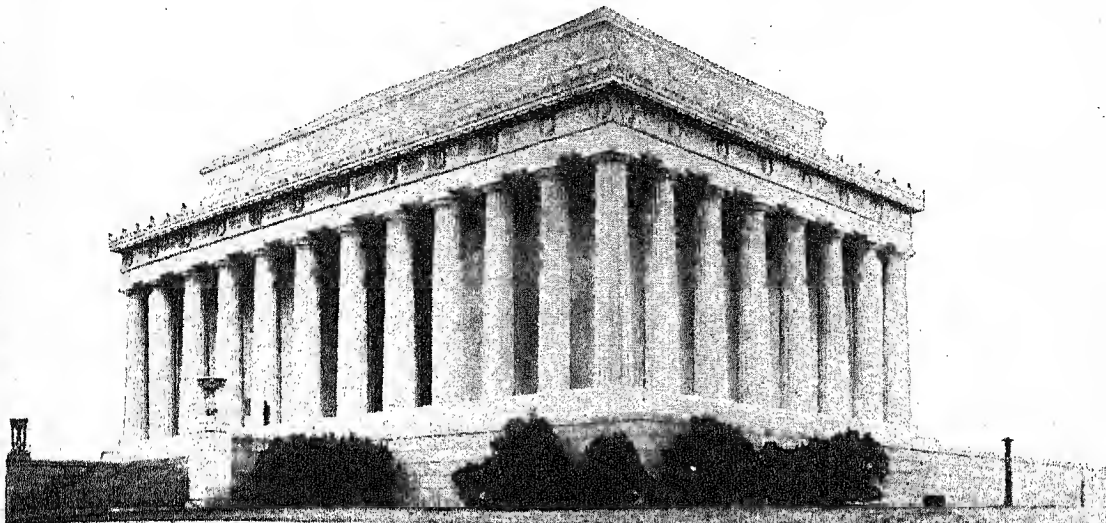
The lime tree is a native of southeastern Asia, particularly India. Most of the limes sold in the United States come from plantations in the West Indies, Mexico, and Florida. The trees, which do not grow more than eight feet high, start bearing in the third year and attain full growth when six or seven years old. Since the fruit spoils readily, it is shipped green. A cross or hybrid between the lime and the kumquat, called a limequat, is hardier than the lime and yields more juice and pulp.

Lime juice, often concentrated by evaporation, is marketed both for flavoring and as a source of citric acid. British sailors are called "lime-juicers" or "limeys" because of the British law requiring a regular allowance of lime or lemon juice at sea to prevent scurvy (*see* Vitamins).

The name lime tree is also applied to various species of linden (*see* Linden). Scientific name of the true lime tree, *Citrus aurantifolia*.

"NEW BIRTH of OUR NEW SOIL, the FIRST AMERICAN"

*How Abraham Lincoln Rose from Obscurity to One of the Greatest Places in History—
His Struggles against Early Poverty, His Fight to Preserve the
Union and Free the Slave, and His Tragic End*



The Beautiful Lincoln Memorial in Washington

*Great captains, with their guns and drums,
Disturb our judgment for the hour,
But at last silence comes;
These all are gone, and, standing like a tower,
Our children shall behold his fame.
The kindly-earnest, brave, foreseeing man,
Sagacious, patient, dreading praise, not blame,
New birth of our new soil,*

The first American.

—FROM LOWELL'S 'COMMEMORATION ODE'

LINCOLN, ABRAHAM (1809-1865). We have a few clear pictures of Lincoln: the spindle-shanked little boy in a long linsey-woolsey shirt trudging barefoot to school—the gawky store clerk stretched out on the counter studying grammar—the husky young man whipping the champion wrestler of Clary's Grove and making a lifelong friend of him—the convincing orator, stirring the people by his sincerity—and the tired wartime President, shot down in the moment of victory and restored peace.

We have also a mass of legends that have grown up about this great, little-known man. After his death, persons who had known Lincoln in his early days racked their brains to remember details of his obscure life. Sometimes they drew on their imaginations to fill gaps in their memories, and to make Lincoln appear more wonderful and themselves more important for their association with him. But even these legends and fictions help us to realize the man's true greatness and the depth of the impression that he left in the hearts of his countrymen.

The scenes of Lincoln's early life remain to us as shrines. His birthplace near Hodgenville, Ky., is a national park, with the restored log cabin enclosed in a stately structure of granite. The Lincoln pioneer village at Rockport, Ind., and the New Salem State Park in Illinois preserve the frontier surroundings that helped to mold his character. His tomb at Springfield attracts thousands of pilgrims.

Lincoln's achievements all came from his own efforts. As a boy he had few advantages. His parents were the children of pioneers who had migrated from Virginia to Kentucky. His grandfather, Abraham Lincoln, had been killed by Indians before the eyes of little Thomas, who became the father of the president. As a young man Thomas learned the carpenter's trade. Soon after his marriage to Nancy Hanks, he bought a barren backwoods farm near Hodgenville in Hardin (now Larue) County, Ky. There in a log cabin Abraham Lincoln was born, Feb. 12, 1809.

This rude one-room hut was much like others in which Lincoln spent his boyhood. It had a floor of packed earth, one small window, and a door hung on leather hinges. At one end was a fireplace. The beds were poles thrust into the wall and covered with bundles of dry leaves and skins. Crude three-legged stools and a table were the only other furniture.

Boyhood of Lincoln

Thomas Lincoln had the roving instinct of the pioneer. He liked to hunt and fish rather than to tend his farm. In 1816 he took his family to Indiana, then in 1830 on to Illinois. When they moved to Indiana, the trail was so little broken that Thomas

sometimes had to take his ax and clear a way for the team and wagon. The first year there on Pigeon Creek, while Thomas was building a cabin, the family lived in a "half-faced camp"—a roofed shelter with three walls and one open side.

Nancy died from the "milk sickness," a fever that killed many pioneers. At that time Abraham was nine years old and his sister Sarah was eleven. The boy helped his father make her coffin.

Soon after Nancy's death, Thomas Lincoln married again. His second wife was Sarah Bush Johnston, a widow with three children. She brought feather mattresses, pillows, and other furnishings to make the cabin home more comfortable. She brought, too, kindness and sympathy. To young Abe especially she gave guidance and encouragement. Thomas Lincoln thought that education was nonsense, but the step-mother insisted that the boy should have a chance to go to school.

Lincoln was eager for learning, though, as he said later, there was nothing in his backwoods life to excite ambition for education. He went to school scarcely twelve months over a period of ten years, but by studying and reading in his spare time he taught himself. "The things I want to know are in books," he said. He read and reread the few volumes he could find in the neighborhood—the Bible, Aesop's Fables, 'Robinson Crusoe', 'Pilgrim's Progress', a history of the United States, Weems' 'Life of Washington', the laws of Indiana, and lessons in elocution. Once he walked six miles to borrow an English grammar. He often wrote letters for the neighbors and made speeches to anyone who would listen.

His Early Manhood

In 1828, and again in 1830, Lincoln went as helper on a flatboat down the Mississippi to New Orleans. This was the usual frontier way of taking produce to market. In the South he got his first sight of slavery. It made a deep impression on him. "If ever I get a chance to hit that thing, I'll hit it hard," he is reported to have said. There is no doubt that ever afterwards he did hate slavery.

When he was 22, Lincoln left home and worked as clerk in a store at New Salem, Ill., on the Sangamon River. The store failed. Then he tried various kinds of work—running a store of his own, managing the

village postoffice, surveying. Lincoln was not a successful business man. His own store failed, and it took him almost 20 years to pay the debts. People liked him, however, and respected him as one of the village leaders. He was tall—six feet four inches—and strong. He could hold his own in the rough wrestling bouts and games of the community, and he was fond of telling humorous stories. But it was chiefly his honesty and sound judgment that won respect for him. Good-humored and tolerant of all kinds of people, he had a rare gift for making friends.

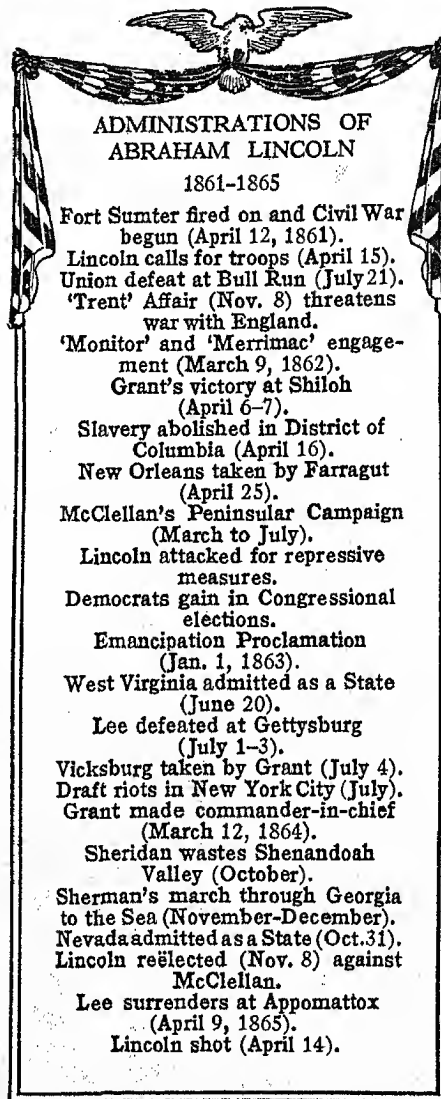
When the Black Hawk War broke out in 1832, Lincoln enlisted. His fellow volunteers, the "Clary Grove Boys," elected him captain of their company. Lincoln saw no fighting, but his willingness to volunteer added to his popularity.

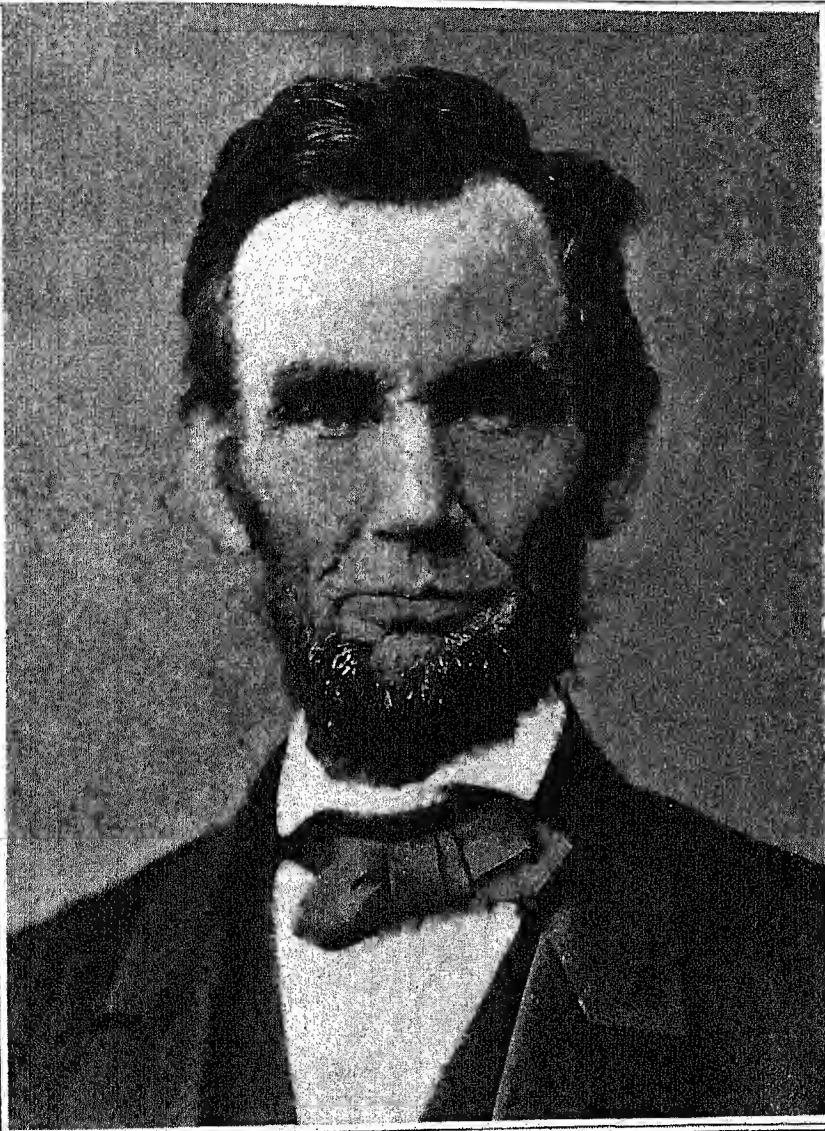
When he enlisted, Lincoln was campaigning for a seat in the Illinois legislature. He was defeated, but two years later, when he was just 25, he ran again and was elected on the Whig ticket. Three times following, he was reelected for two-year terms.

In the legislature he made many friends and had his first training in political strategy and in handling people. He was the leader of his party in the House and took an active part in having the capital of

Illinois moved from Vandalia to Springfield.

During his years in New Salem, Lincoln had read constantly and widely—poetry, history, biography, and law. Now he had made up his mind to become a lawyer, and he began to read all the law books he could find. In 1837 he went to Springfield to begin his legal career. Major John T. Stuart took him into partnership. As a lawyer Lincoln prospered in a modest way. His ability to think clearly and to express his thoughts forcefully and simply was especially valuable. After Stuart went to Washington, Lincoln went into partnership with Judge Stephen T. Logan. Later, he became a partner of William H. Herndon.





ABRAHAM LINCOLN

A great tragedy in Lincoln's life was the death of Ann Rutledge, a young girl of New Salem whom he loved dearly. Her loss plunged him into deep despair. When he was 33, he married Mary Todd, a Kentucky girl who visited Springfield. They had four children.

In 1846 Lincoln was elected to Congress as a Whig and served one term (1847-49). Here he struck his first blows in the fight against slavery. The United States was then at war with Mexico. Lincoln, like many other Northern Whigs, denounced the war as merely a means of adding to the Union new land into which slavery might spread. He moved the adoption of resolutions in which he accused President Polk of making false statements about the origin of the war. He voted for the Wilmot Proviso, which would have barred slavery from the territory acquired from Mexico (see Polk, James K.). He also introduced a bill for the abolition of slavery in the District of Columbia. None of these measures passed, and Lincoln failed to win a renomination.

Back in Springfield, Lincoln devoted himself to his law practice. His interest in politics was aroused again in 1854 by the Kansas-Nebraska Act. This act repealed the Missouri Compromise and granted each territory the privilege of deciding for itself whether it would be slave or free (see Kansas-Nebraska Act; Missouri Compromise). In a powerful speech at Peoria, Lincoln stated his reasons for opposing the spread of slavery. So compelling were his reasoning and his eloquence that he at once sprang into fame as a leader among the champions of the anti-slavery cause. Two years later (1856) Lincoln threw his sup-

port to the new Republican party, which insisted that under no condition should slavery be allowed to expand. His speeches during this period show that he was beginning to oppose slavery not only because he thought it morally unsound, but also because he saw in it a threat to democratic institutions.

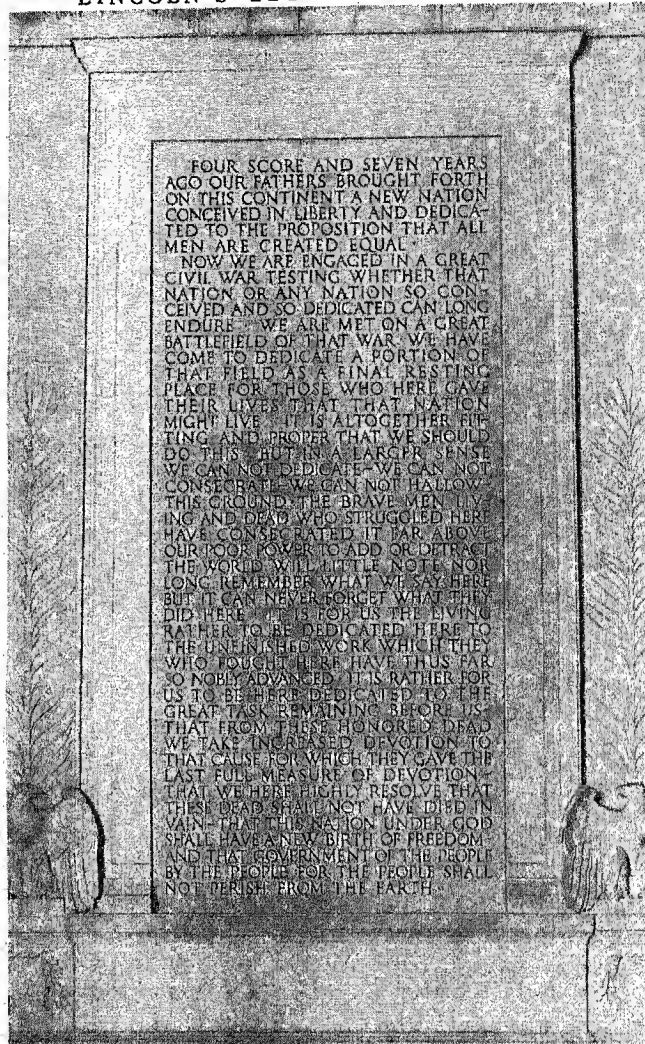
In 1858, Stephen A. Douglas, who had written the Kansas-Nebraska bill, came up for reelection to the United States senate from Illinois. Since Lincoln was clearly the strongest and most popular figure in the anti-slavery forces, the Republicans named him as the candidate to oppose Douglas. In accepting the nomination he stated the issue before the country in these memorable words:

"A house divided against itself cannot stand." I believe this government cannot endure permanently half slave and half free. I do not expect the Union to be dissolved—I do not expect the house to fall—but I do expect that it will cease to be divided. It will become all one thing or all the other." No one then foresaw that Lincoln was the man who would save the Union.

Lincoln and Douglas met in a series of debates that aroused nation-wide interest (see Lincoln-Douglas Debates). Although Lincoln lost the elec-

tion, he was now a figure of national importance. In 1859 he spoke several times in Kansas and elsewhere in the West; then early in 1860 he invaded the East. At Cooper Institute in New York City he gave one of his most famous addresses. Critical audiences in Boston and other New England cities heard his analysis of the slavery situation with surprised admiration.

LINCOLN'S GETTYSBURG ADDRESS

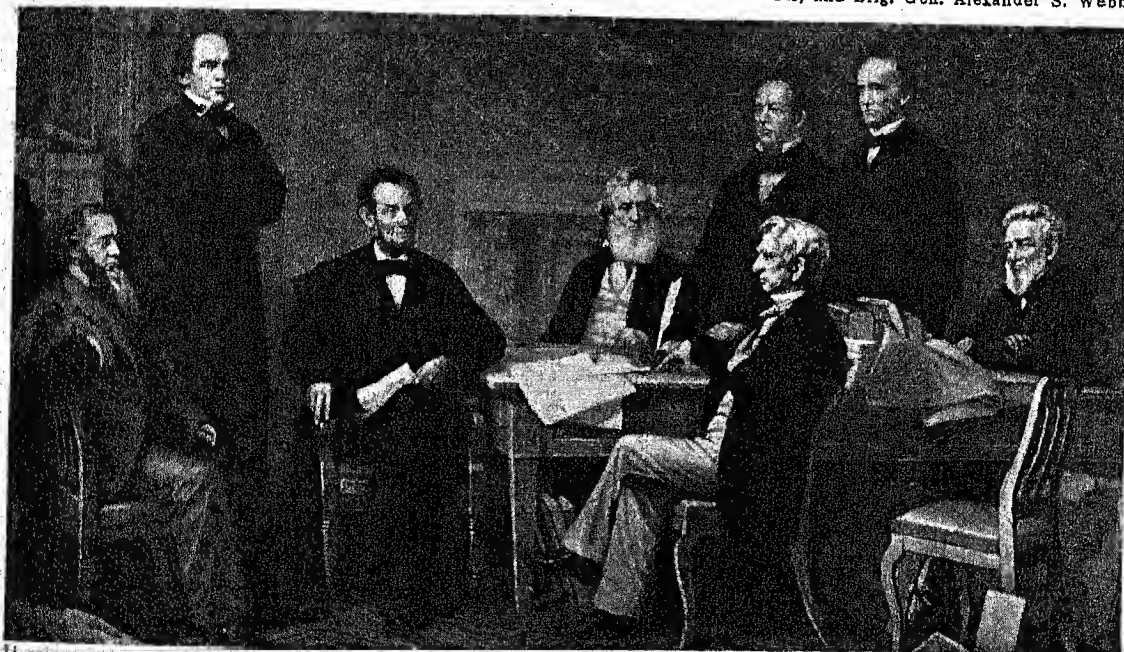


This photograph shows the Gettysburg Address carved into the stone of the Lincoln Memorial in Washington, D. C. The address was delivered by President Lincoln at the dedication of the national cemetery on the Gettysburg battlefield, Nov. 19, 1863. The audience was disappointed at the shortness of the address, and few realized that a masterpiece of literature had been created. But the famous orator, Edward Everett, who had been the principal speaker at the dedication, wrote to Lincoln the next day, "I should be glad if I could flatter myself that I came as near to the central idea of the occasion in two hours as you did in two minutes." Lincoln later wrote out several copies of the speech, with slight variations. His final version is the one reproduced here.

INCIDENTS IN LINCOLN'S CONDUCT OF THE CIVIL WAR

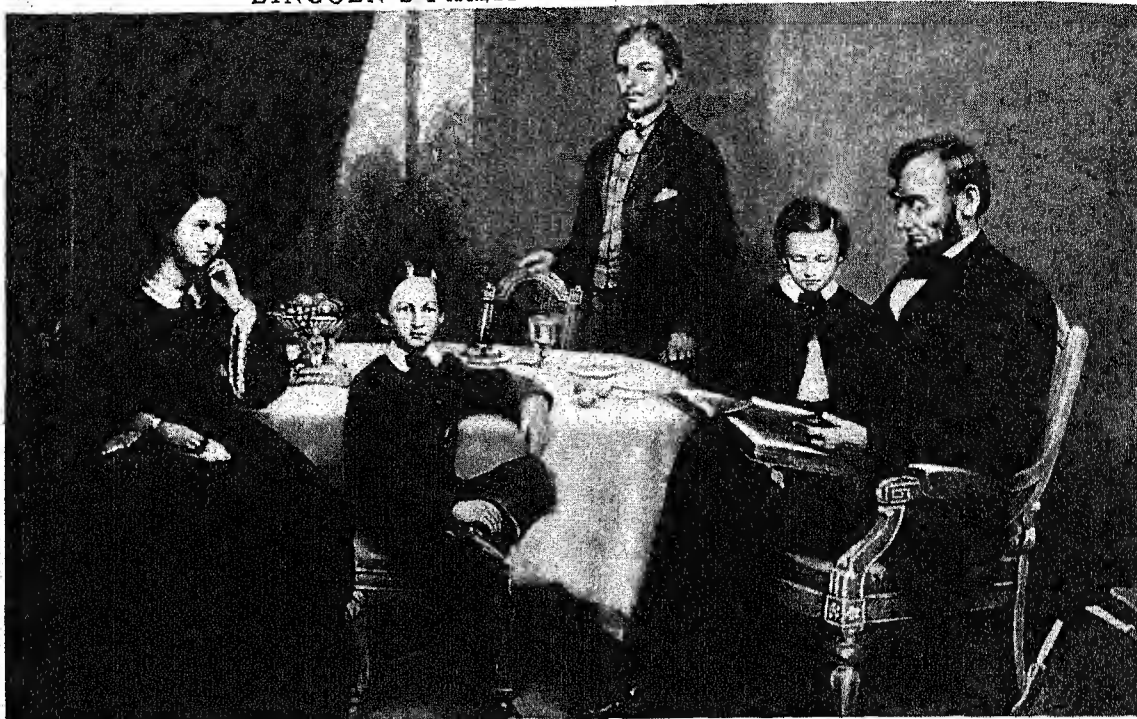


This historic photograph shows Lincoln with officers of the Army of the Potomac. It was taken at Antietam on Oct. 2, 1862, shortly after the battle of Antietam. Lincoln faces Gen. George B. McClellan (left foot forward), Commander of the Army of the Potomac. Five members of the group have not been identified. The others are, from left to right: Capt. Richard N. Batchelder, Maj. Gen. Andrew A. Humphreys, Brig. Gen. Lewis M. Hunt, Capt. Frederick T. Locke, Maj. Gen. George W. Morrell (just to Lincoln's left), Maj. Gen. Fitz John Porter, Brig. Gen. William Sackett, Brig. Gen. Nelson B. Sweitzer, and Brig. Gen. Alexander S. Webb.



Lincoln is here presenting the first draft of the Emancipation Proclamation to his Cabinet on July 22, 1862. At his right are Chase (standing), Secretary of the Treasury; and Stanton (seated), War. Seated immediately at Lincoln's left are Welles, Navy; and Seward, State. Standing are Smith, Interior; and Blair, Postmaster General. Attorney General Bates is seated at the far end of the table. The engraving shown in this photograph was from Francis Bicknell Carpenter's small copy of his famous large painting made at the White House in 1864. Lincoln told Carpenter what occurred during the first reading of the Emancipation Proclamation, and the scene was re-enacted for the artist. The Cabinet meeting took place in what was then the official business room of the White House. Lincoln is shown listening to the remarks of the members of his Cabinet. Chase wanted more forceful wording in regard to the arming of the Negroes. Blair thought the Proclamation would cost the administration the fall elections. Seward approved of the policy, but did not want the document published at that time. So Lincoln agreed to defer it to later in the year.

L I N C O L N ' S F A M I L Y I N T H E W H I T E H O U S E



Of Lincoln's four sons, only Robert, the eldest (center), lived to maturity. Edward, the second, died in infancy. William, who sits next to his mother, died in the White House at the age of 12. Thomas ("Tad"), the youngest, died in Chicago at 18.

When the Republican nominating convention met at Chicago in 1860, Lincoln was one of the lesser candidates, and it was supposed that the nomination would go to Seward of New York. The opposition to Seward, however, was powerful, and it finally united upon Lincoln, who was nominated on the third ballot. A split in the Democratic party insured Lincoln's election. Lincoln, incidentally, had done much to bring this split about. In his debate with Douglas he had made it clear that Douglas' "Freeport Doctrine," which satisfied the Northern Democrats, was a very different thing from the unlimited expansion of slavery that the South wanted. This difference caused the Southern Democrats to refuse to accept Douglas as their candidate. The Northern Democrats, however, would have no one else, so the Southern Democrats nominated a candidate of their own, John C. Breckinridge, of Kentucky. A fourth ticket, the Constitutional Union, headed by John Bell, of Tennessee, and Edward Everett, of Massachusetts, helped further to divide the opposition to Lincoln, who carried nearly every Northern state, and had a clear majority of the electoral college. The electoral vote stood: Lincoln 180, Breckinridge 72, Bell 39, Douglas 12. In the last weeks of the campaign, Douglas abandoned the North to the Republicans, and in alarm at the growing talk of secession, made a tour of the slave states to plead for Bell, who was pledged to maintain the Union.

Lincoln's election was followed in a few weeks by the secession of South Carolina and the formation of

the Confederate States (see Civil War and Reconstruction; Confederate States of America). Hostilities began a month after Lincoln's inauguration, and his term as president coincided with the four years of the Civil War. That struggle, as he saw it, was fought primarily to vindicate the principle of self-government. If the United States should fall, then free government would have little chance of survival anywhere. "For my own part," Lincoln told his private secretary, "I consider the central idea pervading this struggle is the necessity of proving that popular government is not an absurdity. We must settle the question now, whether, in a free government, the minority have the right to break up the government whenever they choose. If we fail, it will go far to prove the incapability of the people to govern themselves." In dedicating the Gettysburg battlefield as a national cemetery, he developed in words as eloquent as have ever been spoken, the same theme, that "government of the people, by the people, and for the people shall not perish from the earth."

When Lincoln went into the presidency he was not yet a great executive. He did not hesitate, however, to surround himself with the greatest men in his party, and he learned how to command them. He learned, also, by painful experiment, the necessity of making difficult decisions and of making them in time.

In one respect Lincoln was preëminent from the beginning. He knew people, and could read accurately the public mind. He saved half the border

states to the Union when, by a single false step, a single harsh word, he might have lost them all. His timely issuance of the Emancipation Proclamation conciliated radical anti-slavery men in the North, and by giving to the war an anti-slavery twist made impossible British intervention in behalf of the South. (See Emancipation Proclamation.) He treated deserters with tenderness, and peace-at-any-price men with ridicule. "Must I shoot a simple-minded soldier boy who deserts while I must not touch a hair of the wily agitator who induces him to desert?"

Despite his knowledge of people and his success at selecting men for civil positions, he had difficulty in securing able military leaders. No commander seemed capable of coping with the tactics of Gen. Robert E. Lee. Congress and public opinion ever clamored for victories and criticized delays, though time was necessary to build an army from raw recruits. This pressure forced the President to issue military orders and dictate strategy, though he realized his lack of military knowledge. After July 1862, when Lincoln put General Halleck in command of the Union armies in place of McClellan, the supreme control of war policies was directly in Lincoln's hands. Thereafter his personal story is merged with the history of the war.

Lincoln's opponents in his second presidential campaign in 1864 said the war was a failure and blamed him for it. They criticized such strong emergency measures as the suspension of the right of *habeas corpus* as unconstitutional. But the voters were with him, and he defeated Gen. George B. McClellan, the Democratic candidate, by a good majority.

Just five days after General Lee's surrender, the President was shot in Ford's Theater by a fanatical Southern sympathizer, John Wilkes Booth, and died the next morning, April 15, 1865. His death was a misfortune for the whole country, but especially for the South. His assassination revived in many Northern breasts a dying hatred for the defeated foe, and at the same time it robbed the conquered states of an able and sincere friend. Lincoln sympathized with the war-torn South and wished it back in the Union on the easiest possible terms. This purpose was in his mind when, a few weeks before his death, he closed his second inaugural address with these words: "With malice toward none, with charity for all, with firmness in the right as God gives us to see the right, let us strive on to finish the work we are in, to bind up the nation's wounds, to care for him who shall have borne the battle, and for his widow and his orphan, to do all which may achieve and cherish a just and lasting peace among ourselves and with all nations."

Among the best biographies of Lincoln are Nicolay and Hay's 'Abraham Lincoln', Ida M. Tarbell's 'Life of Abraham Lincoln', Lord Charnwood's 'Abraham Lincoln', Carl Sandburg's 'Abraham Lincoln, the Prairie Years' and his 'Abraham Lincoln: The War Years', N. W. Stephenson's 'Lincoln', and Albert J. Beveridge's 'Abraham Lincoln, 1809-1858'. The younger reader will like Nicolay's 'Boys' Life of Lincoln', Mrs. J. T. Bayne's 'Tad Lincoln's Father', and Carl Sandburg's 'Abe Lincoln Grows Up'. The last title reprints the first 27 chapters of 'Abraham Lincoln, the Prairie Years'.

LINCOLN-DOUGLAS DEBATES. On July 24, 1858, Abraham Lincoln challenged Senator Stephen A. Douglas to a series of seven joint debates during the campaign for election to the Illinois legislature, which in turn was to elect a United States Senator. Douglas, a Democrat, was seeking reelection, opposed by Lincoln, who had accepted the Republican nomination in his "house-divided-against-itself" speech.

Although the immediate prize was the senatorship from Illinois, the contest was fought on a national stage. Douglas, as chairman of the committee on territories in the Senate, was responsible for the Kansas-Nebraska Act, and was not only one of the half dozen leaders of his party but one of the great public figures of the day. Lincoln was about to prove himself the great "convincer." That these two men felt the part they were playing is certain. In his speech at Quincy, Lincoln described the debates as "the successive acts of a drama to be enacted not merely in the face of audiences like this, but in the face of the nation . . ."

Both Lincoln and Douglas were skilled campaigners. Douglas had certain material advantages. As attorney for an Illinois railroad he had a special train when necessary. Lincoln made his way from town to town as best he could, and once was on a freight train which had to switch to a siding to let Douglas' special pass. But in clearness, force, and moral earnestness Lincoln was more than a match for the "Little Giant."

The first meeting was held at Ottawa, Aug. 21, 1858, and the last at Alton, October 15. The others were at Freeport, Jonesboro, Charleston, Galesburg, and Quincy. At the second meeting, at Freeport, Lincoln prepared a trap for Douglas which changed the course of American history. Disregarding the advice of his friends, Lincoln asked Douglas if the people of a territory could exclude slavery. According to Douglas' doctrine of popular sovereignty, the answer should be yes, but according to the Dred Scott Decision, which declared that Congress had no power to exclude slavery from a territory, the answer should be no. If Douglas answered yes, he would displease the South; if he answered no, he would lose support in the North. Douglas answered as Lincoln had expected, that no matter what the court might do, "slavery cannot exist a day or an hour anywhere unless it is supported by local police regulations," and that a territory could by "unfriendly legislation" keep out slavery.

The immediate result of the debates was a great disappointment to Lincoln, who declared that he was "like the boy who stubbed his toe. It hurt too bad to laugh, and he was too big to cry." The Illinois legislature reelected Douglas, but this "Freeport Doctrine" of Douglas was the direct cause of the break in the Democratic party in 1860, when the Southern Democrats refused to have Douglas as their candidate for the presidency. In spite of defeat, Lincoln was now more widely and favorably known, and was a possibility for the Republican presidential nomination two years later. (See Douglas, Stephen A.; Dred Scott Decision; Kansas-Nebraska Act; Lincoln, Abraham.)

AMERICA'S LONE EAGLE *of the SKY*

LINDBERGH, CHARLES AUGUSTUS (born 1902). What the name of Wright means in the story of machines that fly, the name of Lindbergh means in the drama of the men who fly the machines. On May 20 and 21, 1927, Charles Lindbergh, then 25 years old, flew alone in a small monoplane from New York to Paris. He was the first aviator to conquer the Atlantic Ocean single-handed, and his youth, skill, and courage captured the world's imagination and gave the adventure a place among the epics of heroism.

Charles Lindbergh was born Feb. 4, 1902, at his grandfather's home in Detroit, Mich. His father, whose first name he bore, had been brought in infancy from Sweden to a Minnesota farm and had married Evangeline Lodge Land, a teacher. The boy's first years were spent on the family farm near Little Falls, Minn., but after 1906, when his father was elected to Congress, his winter home was in Washington, D. C. In the summers, he enjoyed life on the farm in Minnesota, where he and his father were free to put on old clothes and go hunting, fishing, and boating together. This farm was made the "Charles A. Lindbergh State Park" in 1931.

The boy traveled so much with his parents that he attended more than a dozen elementary schools. His mother helped him to adjust himself to their varying requirements. He completed his high-school course in three and one-half years, graduating at Little Falls

in 1918. He enjoyed the travel that enriched his school days, but the thing that fascinated him most was machinery. He knew every part of his old bicycle, motorcycle, and automobile, and could assemble the tractor that he ran on the farm.

YOUNG CHARLES AND HIS MOTHER



This is Lindbergh when he was eight years old, photographed with his mother. Already he showed a mechanical bent, and his mother, who had been a teacher, encouraged him to think for himself.

Training for His Life's Work

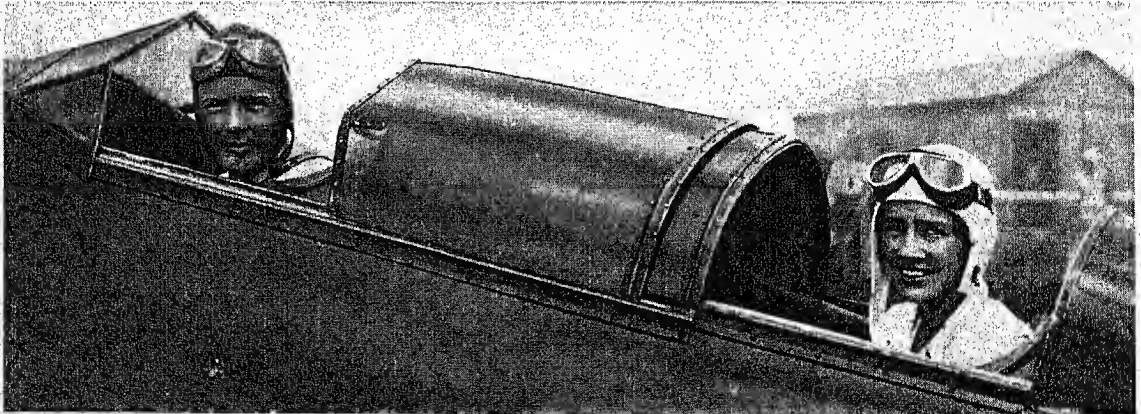
At 18 he entered the University of Wisconsin to study mechanical engineering. He mastered his work, but he was restless. He wanted to fly. At the close of his third semester he left the university to enter an aviation school at Lincoln, Neb. There he worked with motors, learned to make parachute jumps, and to walk along the wing of an airplane in flight. At Americus, Ga., he made his

first solo flight in April 1923. Part of his expenses he earned by "barnstorming"—taking people for short flights or giving exhibitions of parachute jumping and wing-walking.

In March 1924 he enlisted as a flying cadet in the United States Army and trained at Brooks and Kelly fields, near San Antonio, Tex. He was graduated in February 1925 with the rating of pursuit pilot and the rank of second lieutenant in the Army Air Corps Reserve.

Later in 1925, Lindbergh tested airplanes for a St. Louis firm. When this firm was awarded the contract for flying mail between Chicago and St. Louis, Lindbergh made the first flight over the route Apr. 15,

LINDBERGH AND HIS WIFE—COMPANIONS OF THE AIR



Anne Morrow Lindbergh became an enthusiastic partner in her husband's later flights. The two are shown here together in their own plane at the start of one of their long expeditions, during which Mrs. Lindbergh served as navigator and radio operator.

1926. Within a year, he flew more than 50,000 miles over this mail route. Twice he had to make parachute jumps to save his life.

Seasoned by more than 1,500 hours of flying, Lindbergh decided to try for the Raymond Orteig prize of \$25,000, offered since 1919 for the first nonstop flight between New York and Paris. St. Louis businessmen agreed to help pay the cost of building a plane. Early in 1927, he went to San Diego to superintend the building of a Ryan monoplane, which he named the *Spirit of St. Louis*. (For picture and description, see Airplane.)

Lindbergh put his new plane through severe tests. On May 10, 1927, he flew it from San Diego to St. Louis; and on May 12, he leaped to New York, setting a new coast-to-coast record. He entered his name in the contest for the Orteig prize. Only a few days before, on May 8, the famous French aces Nungesser and Coli had perished in their attempt to fly from Paris to New York. When news spread that Lindbergh would try to fly the Atlantic alone, people shuddered. Few knew how carefully he had prepared.

Off for Paris

Early in the morning of May 20 Lindbergh climbed into the *Spirit of St. Louis* at Roosevelt Field on Long Island. Down the runway the plane lurched and bounded. Heavily loaded with gasoline, it clung to the earth, bounced, dropped, and then lifted slowly. At 7:52 A.M., "We" were off, vanishing in a drizzle. Just before nightfall, Lindbergh passed over St. John's, Newfoundland, on the way to the open sea. Through fog, rain, and sleet, the plane throbbed on, true to the course. At 10 P.M., Paris time, May 21, a crowd at Le Bourget Field heard the faint drone of a motor. Louder and louder it grew until the searchlights played upon a silver bird. At 10:21 P.M., it alighted, having flown 3,600 miles in 33 hours and 29 minutes.

From the cabin of the plane, Lindbergh emerged a world hero. At 25 he had performed a greater feat than any other pilot in the history of aviation. He was decorated by the president of France, the king of the Belgians, and the king of England. President

Coolidge presented him with the Distinguished Flying Cross and made him a colonel in the Officers' Reserve Corps. Medals and gifts poured in on him from all parts of the world.

A Career Devoted to Promoting Aviation

Lindbergh soon indicated that he would give his life largely to the task of inspiring confidence in the airplane as a practical means of world-wide transportation.

He refused commercial offers that would have made a fortune for him. Sponsored by the Daniel Guggenheim Foundation for the Promotion of Aeronautics, he flew the *Spirit of St. Louis* to cities in every state of the Union. He then made a good-will swing over Mexico, Central America, and the West Indies, which ended Feb. 13, 1928, before giving his plane to the Smithsonian Institution. He was made air counsel to the Department of Commerce and adviser to commercial aviation companies.

In 1929 he married Anne Morrow, daughter of Dwight W. Morrow, who was then ambassador to Mexico. She accompanied him on most of his later expeditions. In 1931 they blazed a northern air route from New York to China. Mrs. Lindbergh was radio operator, navigator, and co-pilot. In 1933 the Lindberghs made a 30,000-mile air trip, circling the entire North Atlantic coast line, to study air lanes and bases for commercial transatlantic flying. In 1937 they surveyed a possible air route from England to India.

Lindbergh's Contributions to Science

Lindbergh also made contributions to archeology and the technique of medical research. In 1929, flying over Yucatan, he photographed hitherto unknown ruins of the Mayan civilization. Working with Dr. Alexis Carrel of the Rockefeller Institute for Medical Research, he developed a new method for separating red corpuscles from blood serum. In 1935, he perfected an "artificial heart and lungs"—a sterile glass chamber in which parts of the body can be kept alive with a supply of blood and air.

Along with fame, bitter tragedy came to the Lindberghs. Their first child, Charles Augustus, Jr., who

THE FLYER WITH HIS FAMOUS PLANE



This photograph of Lindbergh beside *The Spirit of St. Louis* was made just before he took off on his historic flight to Paris.

was born in 1930, was kidnaped and killed in 1932. In 1935 the Lindberghs established themselves in Europe. Returning to the United States in 1939, Lindbergh soon became a spokesman for the group which was opposed to American intervention in the second World War. After Pearl Harbor, he took active part in the war effort of the United States by serving as a consulting engineer in the manufacture of aircraft.

Mrs. Lindbergh's books include 'North to the Orient', 'Listen! the Wind', describing the 1931 and 1933 flights; and 'The Wave of the Future' (1940).

LINDEN. The American linden, more properly called the basswood, is the largest of the 18 species of linden native to North America. Local names applied to the various species are linn, white basswood, bec tree, lime tree, and whitewood. The basswood thrives in woods and river bottoms from Canada south to Georgia and westward. In summer its flowers with their unusually penetrating fragrance attract great swarms of bees. Honey from the nectar thus obtained has a distinctive flavor and is delicious. The tree may live for several hundred years and some specimens are more than 100 feet high. (For pictures, see Trees.)

The southern basswood, a much smaller tree, is found from Indiana to Florida. It is distinguished by its leaves, which have a hairy, silvery-white undersurface.

The European linden, often called the lime, is cultivated extensively as a shade tree in the Old World. Berlin's famous street *Unter den Linden* was so named because of its linden trees.

Basswood is light and white, and is used chiefly for food containers, such as honey boxes and headings for flour barrels. It is also used for veneer, furniture, musical instruments, and excelsior. The fibrous inner bark (bast) is used in mats, chair seats, and baskets.

Scientific name of basswood, *Tilia glabra*; of southern basswood, *Tilia heterophylla*. Bark of mature trees has deep vertical ridges, separating into thin scales. Leaves 4 to 7 inches long, heart-shaped. Flowers yellowish white, in drooping clusters on slender stalks suspended from leafy bract. Fruit greenish gray, round, downy, and nutlike; remains attached to bract.

LINEN. "Purple and fine linen" was the raiment of princes in Biblical days, and fine linen is still a luxury. The glossy luster of fine table damask rivals silk brocade. The snowy whiteness of bleached linen and its smooth dirt-repelling surface make it the preferred material for shirts, collars, and handkerchiefs. Because linen is an excellent conductor of heat, linen sheets and garments are delightfully cool for summer. Linen towels are preferable to cotton because they absorb moisture more readily. Its great tensile strength makes linen desirable for sailcloth at one end of the scale and the most delicate handmade laces at the other. Heirlooms of lace and table linen, as well as Egyptian mummy cloths, attest the durability of linen.

On the other hand, linen takes dyes less readily than silk, cotton, or wool, and fades more easily. It is more difficult to weave than cotton because it is less elastic and the threads break more readily.

The processes by which linen is made from the flax fiber are described in the article on Flax. Formerly linen was often woven with wool to make "linsey-woolsey," which pioneer women used for their dresses. The finest lace threads are still spun by hand, and it is said that the finest are spun in damp cellars, the spinner making, by touch alone, a thread too fine to be seen.

The quickest test for the purity of linen, and the one which, though not infallible, is generally employed, is the touch of the moistened finger; if the moisture comes through slowly, the fabric is probably part cotton. Another test is to set a thread on fire; cotton will blaze, but linen will smolder. The surest method is first to boil all the dressing out of a sample and then put it in a 50 per cent solution of caustic soda; this will turn cotton light yellow and linen almost brown.

The valley of the Nile was the original home of flax and linen. Some of the chief centers of linen manufacture today are Belfast (Ireland), Dundee and Dunfermline (Scotland), Leeds (England), and certain towns in northern France, Belgium, and Germany.

LINNÉ, CARL VON (1707-1778). The Swedish naturalist and physician Linné brought into general use the system of naming plants and animals which is now universally employed. This is the *binomial* (two-name) system, in which each plant and each animal is assigned a name consisting of two Latin words. The first word is the name of the *genus*, and the second is the name of the *species*. (See Biology.) So important was Linné's work of classification, especially in botany, that he is called the "Father of Systematic Botany."

Linné, who is more often known as Linnaeus (the Latin form of his name, under which he wrote) was born at Rashult, Sweden. His father was a pastor and hoped that the boy would follow the same calling. But Carl was more interested in plants and animals than in reading, and did so poorly at school that his father proposed to apprentice him to a shoemaker. The village physician saw, however, that the boy had unusual gifts and encouraged the father to help him while he studied medicine at the University of Uppsala. Here his talents soon won him an appointment as assistant in botany. Later the Academy of Sciences of Uppsala sent him on a 5,000-mile botanical survey of Lapland. He supported himself by lecturing and tutoring, but was too poor to take his degree. Aid came from his future wife, who helped provide the funds with which he obtained his doctor's degree in medicine at a university in Holland.

In Holland Linné got the position of medical attendant to an Amsterdam banker, who had a large botanic garden. Linné was made director of this, and in the next few years published his 'Systema naturae' and 'Genera plantarum', into later editions of which he introduced his famous system of classification.

After scientific journeys to France and England Linné returned to Stockholm to practise medicine.

In 1742 he was appointed to the chair of botany at Uppsala. There he spent the rest of his active life. Students came to him from all quarters of the civilized world, and searched the earth for specimens to contribute to his studies.

Linné's system of classification was an artificial one. In botany it was based mainly on the number of stamens and pistils in the flower. He himself regarded it as only a temporary convenience, to be supplanted by a natural system whenever the fundamental relationships of the plants should become known. In the 19th century the theory of evolution supplied the knowledge needed to set up a natural system, but the broad outlines of the Linnean system were retained.

LIPOLEUM AND OILCLOTH. Linoleum was introduced as a floor covering in England in 1860 by Frederick Walton, who coined the name and patented the modern process of manufacture. It is made by mixing ground cork, oxidized linseed oil, various gums, and coloring matter, then pressing the mass on a backing of jute burlap. It is hung in drying rooms to season

for a period of one to six weeks, depending on the thickness and quality.

Plain linoleum has no pattern and comes in solid colors, or in two tones of one color. Printed linoleum is made by stamping a design of oil paints on a thin grade of the plain. Inlaid linoleums, the most expensive kind, have the color and pattern extending through to the burlap backing.

Linoleum should be cemented down to keep it smooth and even and to prevent moisture from getting under it. If improperly laid it will buckle and crack. Varnish on the printed linoleums and wax on the inlaid and plain varieties will preserve their life. Strong soaps and cleaning powders are injurious.

An inexpensive felt-base floor covering which resembles printed linoleum has a base of paper or felt saturated with asphalt and finished with paint and a printed design.

Oilcloth is made by a similar process of coating coarse cloth with white lead mixed with pigments, then printing a pattern on the surface.

The MARVELOUS LIPOTYPE and WHAT IT DOES

LIPOTYPE. In 1885, after many years of experimenting, Ottmar Mergenthaler, a naturalized American of German birth, patented the lino-

WITH his invention of individual types, Gutenberg unlocked the gates of knowledge and put books, hitherto the costly possession of the few, into the hands of the many. The invention of the lino-

type by Mergenthaler, 400 years later—one of the triumphs of modern invention—makes possible the prodigiously rapid production of the newspapers and magazines of today.

type, a revolutionary invention which is one of the mechanical marvels of the world. Mergenthaler's first successful machine was put into operation by the *New York Tribune* in 1886. With many improvements contributed by numerous inventors, lino-

type machines today print most of the world's newspapers, and many magazines and books. Many men before Mergenthaler had worked on inventions for typesetting machines that would "compose," or bring together the type by touching a keyboard, but these devices were usually too cumbersome, and required two or even three men to operate them, so they remained mere curiosities.

able that they had to be carefully "distributed" again into their proper places after they came off the printing press—a most tedious operation. Often these masses of type would spill onto the floor, the resulting mass being nicknamed "pi" (see *Typography*).

Since the 15th century, when Gutenberg, also a German, developed the method of casting individual metal types, printing had made comparatively slow progress. Before Gutenberg's time, artists had already learned to cut pictures in wood, and had inked the wood blocks and printed proofs from them. Some artists also cut brief captions, describing the pictures, in the wood; but it was apparently Gutenberg who first of all worked out a process for rapidly and cheaply casting separate types of accurate dimensions in metal.

A skilled operator could set up an average of 3,000 characters an hour—enough to make 60 lines, or just about a column of the type used in this book. Distributing could be done about twice as fast, one apprentice usually being able to distribute the type set by two compositors.

Setting Type by Hand

Out of Gutenberg's invention grew all modern printing. But the type was all set by hand, the books our fathers read having been printed from type set up a letter at a time by "compositors." A man would stand for hours at a time in front of a "case" containing thousands of characters in more than a

Advantages of the Linotype

This was the system followed for nearly 400 years after Gutenberg, and there was almost no other way of printing until Mergenthaler gave the world the extremely ingenious linotype. About this time another typesetting machine, the monotype, was also evolved. (See *Monotype*.)

Not the least of the advantages of the modern machines is that they do away entirely with the necessity of distributing the type when the printing is done. Instead, the type metal is simply thrown into the melting pot, to be used over and over again in new type combinations.

It was Mergenthaler's clever brain which worked out the underlying idea of the linotype, the machine at which a man can set up type nearly as fast as he might write on a typewriter. It is a machine that almost thinks; is in itself one of the mechanical

wonders of the world, and with the power press has brought cheap books within reach of everyone.

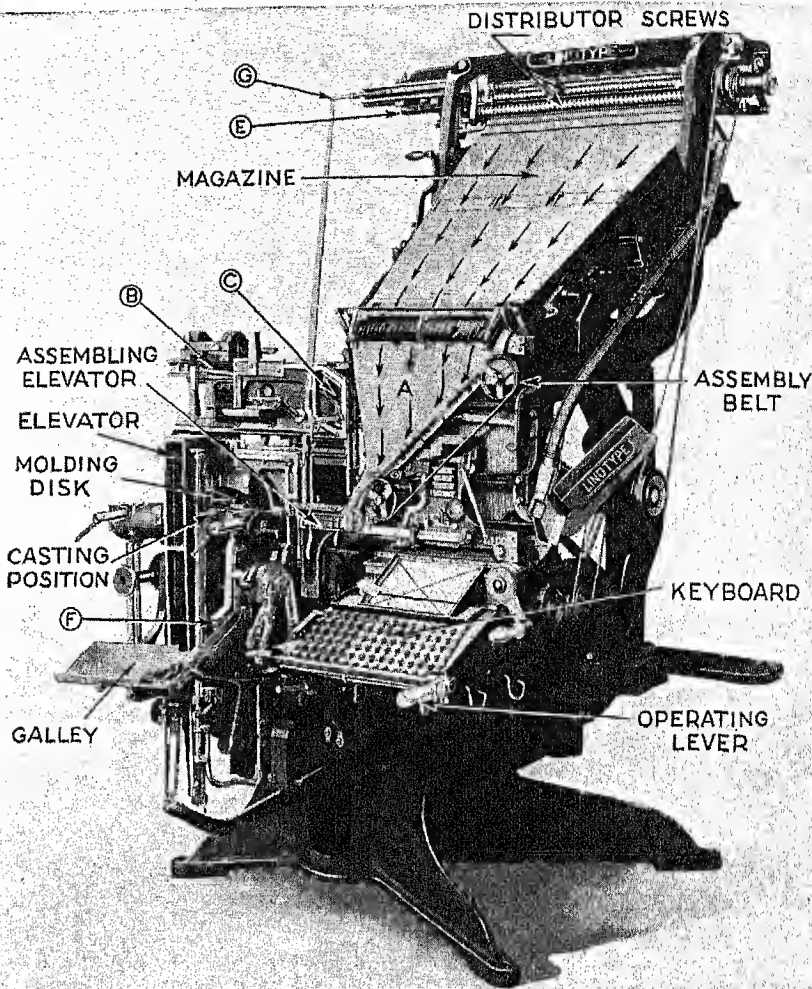
And how it saves labor! A good linotype operator sets 10,000 characters an hour—as much as three hand compositors—and distribution is done away with. Without these savings in time and labor the modern newspaper would hardly be possible.

Here we see the linotype and the way it works; practically every newspaper and most magazines you read are “set up” by machines like this. There are a number of different models of these remarkable devices, but they all work on much the same principle, whether they are at work in the United States, Continental Europe, Great Britain or far-off Australia or South America.

1. The linotype, so called because it sets up a “line of type,” is shown complete in Fig. 1. In each of the magazines at the top are many hundred brass matrices, or molds, with the faces of nearly a hundred different characters cut in them. When the operator presses the keys of the keyboard, a wonderfully delicate mechanism is brought into play which delivers the matrices in the proper sequence to the assembling belt through the channels A. The matrices coming down from the magazine are combined with the spacing bars, or “spacebands,” which are stored at C, and when the operator has assembled a full line of matrices and spacebands, he presses down with his right hand on the operating lever which raises the matrices slightly in the assembling elevator.

The entire group of spacebands and matrices is then carried to the left to the casting position, the spacebands—which are wedge-shaped—are struck from below to expand the line of characters to fill the full width of the line. Molten type metal is then forced through a slot in the molding disk against the matrices and as a result an entire line of type is cast.

The water-cooled molding disk revolves part way around while the metal is solidifying, and the slug of still hot but now solid metal is forced past knives



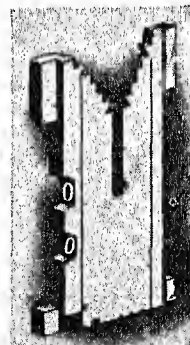
1. The Linotype and its Marvelous Mechanism

which trim it to the desired size. The slug then continues out through the channel F and takes its place in the galley next to the line cast just previously.

2. Here we see a matrix itself, an oddly shaped little thing of brass. First of all we must notice the letters cut in its side. In the matrix shown are two letter o's, one in roman type and the other in italic, so that either may be used at the choice of the operator. Notice that the letters are really tiny hollow molds, instead of projections. It is in these little molds that the type is cast.

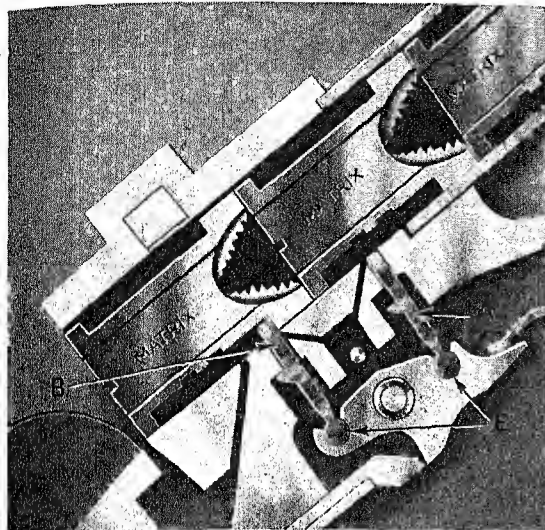
Notice also the peculiar teeth in the V-shaped notch at the top of the matrix. These teeth serve a special purpose, which will be shown later.

3. Now that we know what a matrix looks like, let us trace its



2. The Little Brass Matrix which Casts the Face of the Type

path through the machine. First we must understand the escapement which controls the dropping of the matrices onto the assembly belt. In Fig. 3 we see three matrices resting in their "channel" in the magazine. The one at the left will drop first as it is released by



3. How the Matrices Drop

the withdrawal of the pawl B, brought into action by the pressing of the key for this channel. Notice, however, that there are two pawls, the second one, A, being below the center matrix, but not engaging it. Through a swivel arrangement, both pawls connect to a rocking lever, or verge, at E, so that only one pawl at a time can project up into the channel.

The verge is rocked back and forth *once* by an ingenious mechanism when the key is pressed, thus lowering pawl B but at the same time raising pawl A, which catches the second matrix before it can drop. On returning to the position shown, the pawls let the matrix slide until it is caught by pawl B.

Having pressed a key to start the matrix moving, let us follow it. As soon as it is released, it slides through a channel out of the magazine and down on the assembly belt. This is so cleverly arranged that, although there are nearly a hundred characters coming from different distances, they all take the same time to travel from the escape pawls to the assembly elevator. This insures that the characters making up a word will come in the proper sequence at the assembly elevator.

How Lines are Spaced

4. Now we come to one of the most ingenious parts of the entire machine—the automatic spacing or "justifying," of the lines. In a line of type, we are allowed just so much space to fill—no more, and no less. But our letter characters make up words of varying length, and there must be spaces between them. These spaces must take up all the rest of the width of the line. For many years this problem was a stumbling block for inventors. It was finally solved

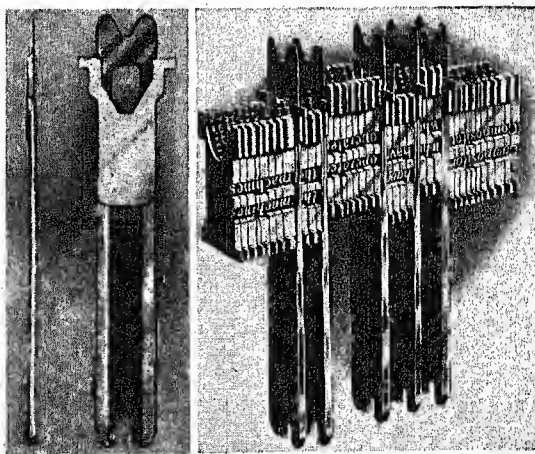
in a very clever, yet surprisingly simple manner. Let us refer back to Fig. 1. You see that the spacebands are stored at the point C. These spacebands are made of spring steel, and are in two parts. One part is shaped a great deal like a matrix, but of course it has no mold cut in its face. This part carries "gibs" or slide-ways, and the other part, which is wedge-shaped, slides up and down on it. Being wider at the bottom than at the top, the wedge naturally takes up more space if it is forced up high between the matrices than if it were allowed to remain low.

The operator fills the line in the assembly elevator with matrices and spacebands until he cannot get another full syllable in the remaining space. He then depresses the operating lever, raising the elevator up until a projecting piece on it strikes a little tripping lever on the machine, which then takes up the work, performing the balance of the operations automatically, while the assembly elevator returns to the operating position to be filled with more characters.

When the spacebands and matrices reach the casting position, a bar moves up from below and strikes the spacebands firmly, driving them up as far between the matrices as possible, thus automatically filling up all the remaining space just before the type metal is forced into the matrices.

In Fig. 4 we see a line of matrices spaced out with the wedge-shaped spacebands, and also how the matrices may be located to cast the italics. If you turn this page upside down you can read the characters which will be cast.

You would have believed yourself a clever inventor if you had thought that out; but it is only one of a hundred clever things in the linotype. The inventor of the spaceband was an American, John R. Rogers,



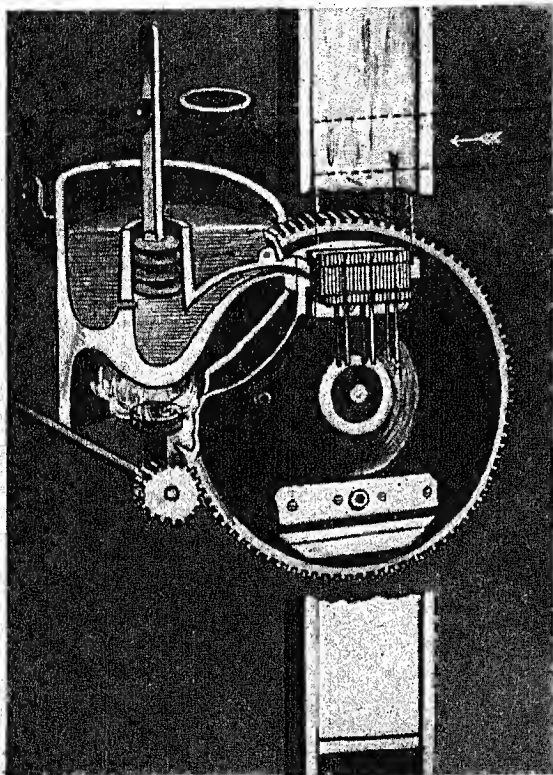
4. Little Sliding Wedges that Space Out the Words

who has to his credit not only more than 400 inventions on the linotype, but who helped to make the Liberty motor and radio-telephone a success.

5. At the back of this wonderful machine, and in the very heart of it, are located the molding disk and the pot of molten type metal. The modern molding

disks are cooled by circulating water, and are provided with as many as four different molding slots, which may be of different widths and thicknesses. The operator can quickly set the machine to bring the required slot into position. The type metal is kept liquid by electricity, and is automatically fed into the pot to keep it full.

When the matrices and spacebands are in place before the slot, a plunger forces the type metal into contact with the matrices and fills the space behind,



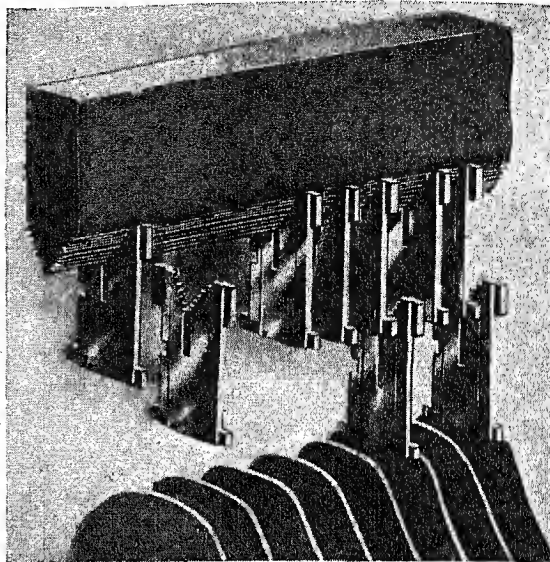
5. The Letters Arrive at the Casting Mold

or within, the slot. When this metal solidifies—a matter of seconds—the molding disk revolves, the slug of metal is forced out and trimmed to proper height and thickness, and is then pushed out of the machine on a galley, where it is in line with the previously set type.

Returning Matrices and Spacebands

6. Now we come to another wonderfully ingenious feature of the linotype. We are through with the brass matrices, and the spacebands, and must get them home again. But they go to different places, and we now have them together.

After leaving the molding disk, the matrices and spacebands are carried upward by an elevator. Then a long arm swings downward from beside the magazine, and picks up all the matrices at B (Fig. 1), but leaves the spacebands. The latter are pushed directly to the right and fall into their storage space C (Fig. 1), while the long arm carries the matrices up



6. How the Matrices Find Their Way

to the side of the magazine. Here a pushing mechanism G (Fig. 1), slides the matrices away from the pick-up arm, and on to a peculiar track, Fig. 6.

Here the matrices are moved along by the revolving distributor screws shown in Fig. 1 until each matrix comes directly over its proper storage channel in the magazine. There, it drops automatically. If you will note the illustration (Fig. 2) of the matrix, you will see that the top is notched deeply in a Vee-shape. Each different matrix has a separate combination of teeth projecting from the sides of this notch. These teeth hook into certain ones of the many grooves in the distributing track and so support the matrix as it moves along. But at the place in the track directly over the magazine channel where each matrix belongs, the particular combination of grooves that supports that matrix is cut away. Thus, when the matrix reaches its proper place it simply drops off the track.

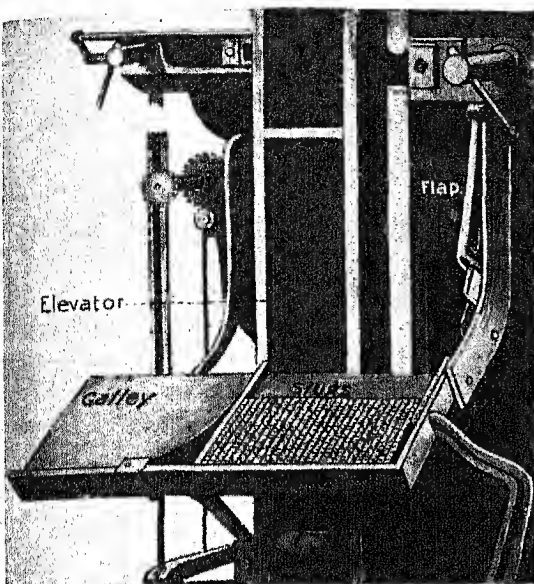
7. This is the line of solid type or the slug as it leaves the molding disk. The letters on the matrices are cut into them and read like print. On the slug,



7. The Line of Type

however, the letters are raised and read backward, in order to make them come right when printed. If you hold this picture up to a mirror you can read the words that are cast on the slug. The side ribs prevent one slug from sticking to the next one.

8. One after the other these slugs slide from the machine and form into columns that will presently march into print. It seems a simple result to come



8. The Lines of Type Grow into Columns

from so complex a machine. Yet it was to bring about this simple result, quickly and accurately, that Mergenthaler and others devoted years of effort. Even now a new generation of inventors is at work to improve the linotype and add to its performance. Now we have linotypes with as many as three main magazines at the top instead of one, and with two complete alphabets in each. Then there may be three auxiliary magazines that carry one alphabet each of big display typefaces, so that a single machine may have a total of six magazines with nine alphabetical sets in different sorts of type, with a total of 642 separate characters all worked from one keyboard.

By the use of different "fonts" of matrices and different sizes of molding slots, slugs may be cast with a body size from 5 point to 36 point ($\frac{3}{8}$ inch) and up to 5 inches (in some machines 7 inches) in length, with letters from 5 to 60 points ($\frac{5}{8}$ inch) high.

Fifty-six operations go into the making of a matrix. The letter is designed, traced on a

brass plate which serves the master pattern, and a pantograph device following the pattern cuts the character on a steel punch which cuts the matrix.

The Intertype

Closely resembling the linotype in appearance, but differing in some details, is the intertype. This machine, a development from the older linotype, is able quickly to cast a slug having several widely different typefaces, by an improved method of shifting from one magazine to another while in operation. The line printed just below shows an extreme case of this ability of the intertype:

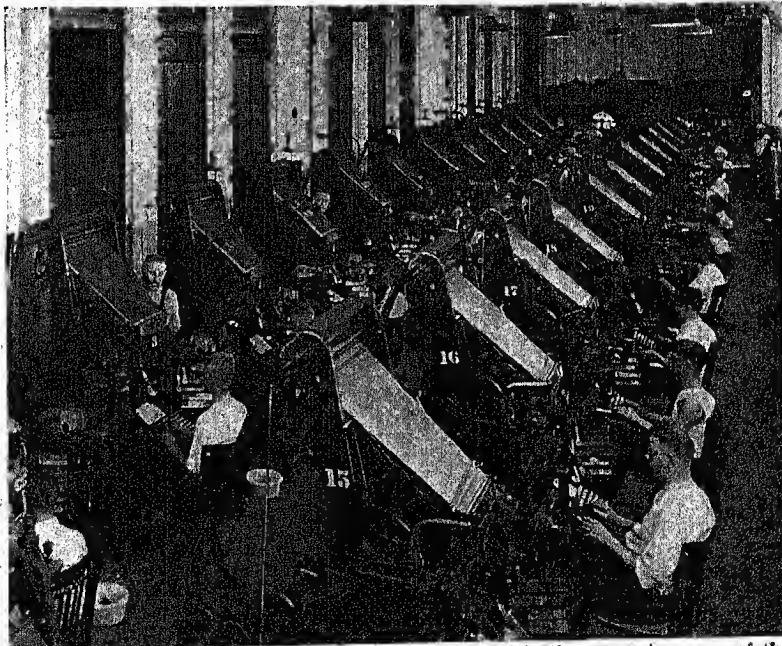
COMPTON's PICTURED Encyclopedia

Here, in one quickly set line, we have eight kinds of type. From left to right along the line they are bold capital initials (first letter of each word), bold-face small capitals, boldface italic, boldface lower case, boldface italic capitals, roman, light italics, and small roman capitals.

By means of special molding disk equipment the intertype can cast very large display figures and letters, as well as make large borders. This form of work is widely used in newspaper display advertising.

The operator of the intertype need not leave his chair to change from one magazine to another; this is accomplished by a simple turn of a crank. Other slight but important differences are found in the design and construction of the matrices, which are interchangeable with those of the linotype, and are often used on linotypes.

A LINOTYPE "BATTERY" IN A NEWSPAPER PLANT



This view shows less than one-third of the linotypes used in the composing room of the *Chicago Tribune*. Not only are the machines equipped to set an amazing variety of type, but when a big news story "breaks" the copy is divided into fairly short "takes" and given to a number of operators. Thus the whole story may be in type and ready for the stereotype in nearly as short a time as it could be written on a typewriter.

KING LION Monarch of the Cat Family



LION. Can you imagine that your cat—that soft, gentle, playful, purring pet—belongs to the same family of animals as the majestic lion which many centuries ago was given the title “the king of beasts”? “That cannot be true!” you exclaim at first thought. “A cat and a lion are not at all alike.”

But you are mistaken. They are very much alike indeed, except in size and perhaps in color. Of course there are other differences of minor importance. Thus the pupil of the cat's eye is elliptical, that of the lion is round. The cat is a good tree-climber, but the lion rarely climbs trees. The cat's fur is of nearly an equal length all over its body, while the male lion possesses a mane which, when at its best, covers the fore part of its body including the head and gives the creature a truly royal appearance.

In ancient times the lion inhabited the whole of Africa, all the southern part of Asia, and a large part of south-eastern Europe. It is still found in many parts of Africa and Asia though in greatly reduced numbers. A large lion measures from nine to ten feet in length, including the tail, and is four feet high. It is not as large as the largest tigers, some of which attain 11 feet in length and weigh

from 450 to 500 pounds. But the strength of the lion is prodigious. With a single blow of its massive forepaw it can crush the skull of an ox or break the back of a horse, and it is capable of carrying off a bullock in its jaws. It can cover 30 feet at a single bound, and few animals except the antelopes can outrun it. Its tawny color blends readily with its natural surroundings and renders the lion almost invisible in its native haunts.

Authorities disagree in regard to the hunting habits of lions. It seems probable that as a rule they live and hunt singly, except during the mating season

and while the young are half grown, when the whole family unites in the chase. Travelers in South Africa report that lions are sometimes seen hunting in droves of from six to ten. These droves may be composed of two or more female lions and their cubs.

In common with most members of the cat family, the lion prefers to hunt at night, setting forth at sunset and lying in wait for its prey at a watering place, or beating the range stealthily,

in true catlike fashion, keeping to the leeward of the breeze, and cleverly taking advantage of every bit of cover until it is within striking distance. Then

A FIGHT AT CLOSE QUARTERS



The natives of the African interior frequently hunt lions on foot, armed with no better weapons than spears. Here we see a party of Kafir warriors who have a lion at bay. Surrounded by the shouting and singing throng, the lion is confused and hesitates. Then a great black spearman leaps forward; the lion rushes at him, only to be met by a well-directed spear. Soon twenty spears put an end to the battle. The hunters, however, are often wounded and killed in these encounters before the lion is dispatched.

it utters its terrifying roar and leaps upon its victim, which it dispatches by biting in the neck. The lion rarely attacks an elephant, but deer, antelopes, zebras, wild asses, and buffaloes, as well as domestic animals, including camels, are on its regular bill of fare. A full grown buffalo bull with its long sharp horns is the only one that is capable of successfully defending itself.

Man-eating lions are not common. It is said that usually they are very old lions, and that, like the tiger, when once they taste human blood they persist in the habit as long as they live. Man-eating lions have been known to enter the native villages and carry off a man or a woman in their jaws, in spite of fires

and shouts and beating drums. The story is well known of the two lions which killed so many native workmen that for weeks they halted the building of the Uganda railway.

The young of the lion, generally only two in a litter, are born in a den in some secluded spot selected by the mother lion, who guards them jealously and does not permit even the male lion to approach. Like the tom-cat, the lion is inclined to make a meal of his offspring. The mane begins to grow on the young male during its third year, but it does not attain its full growth until the seventh or eighth year. Lions live from 40 to 50 years. They are easily kept in captivity. Scientific name, *Felis leo*.

The Story of Androcles and the Lion

EARLY one morning, in the First century A.D., a weary man came to a cave in an African desert, and flinging himself on the ground, fell into a sound sleep. This poor man was a Roman slave named Androcles, who had been carried from Rome to northern Africa. His master was very cruel and he had watched his chance to make his escape through the darkness.

Suddenly he was awakened by a terrible roar, and starting up, he beheld a huge lion standing at the entrance to the cave. He had been sleeping in the lion's den. There was no way of escape; the beast barred the way. Terror-stricken, he waited for it to spring upon him and tear him to pieces. But the lion did not move. It stood there moaning and licking one of its paws. Then Androcles noticed that the paw was pierced by a great thorn and that blood was flowing from the wound. Seeing the poor animal in pain, he forgot his fear, and taking the paw in his hand, drew out the thorn and stopped the blood.

For three years Androcles and the grateful lion lived together in the cave. They hunted together, ate together, and slept together.

But Androcles longed to be once more among his fellow-men, and he left the lion's cave. Very soon he was caught by some soldiers and sent to Rome. In those days the Romans were very cruel to runaway slaves; they ordered them to be thrown into the arena to fight wild beasts for the public amusement.

Androcles was pushed into the arena, which was surrounded by crowds of people. A lance was thrust into his hand and he was told to defend himself against a powerful lion, which had been kept without food for several days in order to make it more ferocious.

Androcles shook with fear as the cage was opened and the lion sprang out with a terrible roar. But instead of rushing upon him, it showed itself friendly and began to lick his hands. Then he saw it was the very lion that had been his companion in the cave. Androcles leaned against the lion's mane and wept.

All the people marveled at this strange sight. The emperor sent for Androcles and when he heard his story he set him free and presented him with a large sum of money. After that, whenever Androcles walked through the streets of Rome, the faithful lion followed him about like a dog.

LIQUID AIR. If you had some liquid air in a container it would look much like water, only it would not be so clear. But it would act very differently from water. If you poured it on a block of ice it would boil vigorously, sending off clouds of vapor. A steel watchspring dropped into it and touched with a lighted match would burn beautifully, with a dazzling shower of sparks. A piece of rubber dipped into it becomes as brittle as glass, and an egg appears as a shining blue ball.

Just as water passes into steam at its boiling point 212° F., and becomes solid ice when the thermometer falls below 32° F., so all other matter changes by the addition or subtraction of heat. Even iron becomes liquid and then passes into heavy vapor fumes when the temperature reaches a certain high point. Air is made liquid by lowering its temperature under pressure to 312° below zero (Fahrenheit), a cold so

intense that we could not survive an instant in it. Although it is then a liquid it is not wet, any more than molten iron is wet. At a lower temperature still, liquid air changes to a solid.

It was discovered in 1894 that when air becomes liquid it resolves itself into its elements—oxygen, nitrogen, and certain rare gases. The carbon dioxide soon crystallizes as a solid; the liquid remaining is cloudy, and it can easily be filtered out. Liquid nitrogen evaporates more readily than liquid oxygen, and so it comes off first. Thus as the liquid air evaporates it becomes richer and richer in oxygen.

Practical use is made of liquid air to manufacture oxygen from the atmosphere, to obtain nitrogen for fertilizing purposes, and as a refrigerating agent. It can also be used as an explosive, as it exerts a pressure during evaporation of something like 10,000 pounds to the square inch; but it is hard to control.

LISBON, PORTUGAL. Seven miles from the Atlantic, up the wide channel of the Tagus River, lies Lisbon (or *Lisboa*), capital of Portugal and westernmost seaport of continental Europe. The approach from the sea is like a trip up the neck of a great bottle, for immediately above the city the river broadens out into a tidal lake, 4 to 8 miles wide and 11 miles long, forming one of the best harbors in the world. Here great steamers from South America and from Portugal's distant colonies in Africa or the East Indies lie at anchor alongside British or United States merchantmen, while native fishing boats with bright-painted hulls and three-cornered sails bring in their catch, with songs and shouts from the half-naked dark-skinned crews. The wharves and quays stretch along the northern banks of the river and lake for five miles. Beyond them the city itself rises in terrace upon terrace of white houses and green parks, backed by the granite mountains of Cintra.

Lisbon is almost entirely a modern city, for the earthquake of 1755, which killed more than 30,000 of its inhabitants, left only a small section of the town standing. This section contains, however, many interesting relics of ancient days. Here in the cathedral, first built in 1150, is the tomb of St. Vincent, patron saint of Lisbon, and in the cathedral grounds near by are kept a pair of ravens, popularly believed to be descendants of the birds which, according to legend, guided the saint's vessel to the city in the 3d century.

The modern part of Lisbon is not surpassed in beauty by any European capital. The streets are straight and broad, the finest of all being the Avenue of Liberty, a mile long and 300 feet wide, with a double row of shade trees down the middle; its name commemorates the freeing of Portugal from Spain in 1640. Between the terraced levels of the city elevators carry people up and down. Lisbon also boasts one of the finest botanical gardens in Europe.

Few large cities are more colorful. Modernistic buildings soar up between ancient red-roofed, white-walled houses. Fashionable people rub elbows with sturdy fishwives, who balance dripping trays of fish on their heads. Fruit vendors and laden donkeys wind their way between streetcars and automobiles. Ox-carts rumble over the cobblestones of this almost spotlessly clean city, bringing farm wares to market.

During the second World War when other ports were blockaded, neutral Lisbon was Europe's chief outlet. It became the terminus for transatlantic planes from the United States. Thousands of refugees from war-torn nations swelled its normal population. The chief manufactures of Lisbon include tile, pottery, fertilizer, textiles, and canned food. Its chief exports are wine, fish, and cork. Population, about 585,000.

Lisbon was probably founded by the Phoenicians, for it was a flourishing town before the Romans occupied it. It was held by the Moors from 711 to 1147. Vasco da Gama set sail from Lisbon for his voyage around Africa in 1497, and it was from here that the Spanish Armada started on its ill-fated voyage in 1588, while the city was in the hands of Spain. Lisbon was the chief scene of the Revolution of 1910, when the crews of revolting warships shelled the palace, and King Manuel was driven pell-mell from Portugal and the republic established.

LISZT, FRANZ (1811-1886). The flickering lights of a gypsy campfire fall with softening glow over the gaudy garments and dark passionate faces of a group of singers gathered about it. Slightly apart in the shadow sits a pale dreamy-faced stranger listening. The fire burns low and the song with its mournful lament, its glad mad gaiety and plaintive wistfulness, dies away; but still the stranger sits, transfixed and silent in the darkness.

It was the great musician, Franz Liszt; and that night by the gypsy campfire there were born in his soul the strains that later were to leap forth at the touch of his fingers upon the piano keys in the witchery of his 'Hungarian Rhapsodies'.

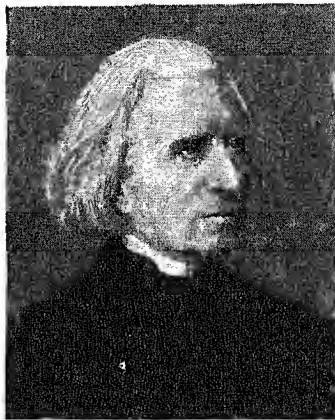
This "Hungarian wonder child," as Liszt was called, began his public career at the age of nine. His father, an accomplished musician, taught

him the theory of music and to play the piano. But the strange rhythms, and weird sweet melodies of his compositions he owed to the wandering gypsy bands of his childhood home in western Hungary.

As a little boy Liszt showed such musical genius that Hungarian noblemen furnished the money for his parents to take him to Vienna and give him the best musical instruction. At the age of 12 his playing so moved the great Beethoven that, lifted from his customary reserve, he took the child in his arms and kissed him. At 14 years of age Liszt composed a successful operetta, and from this time on his compositions were eagerly received.

Liszt's life was a long series of artistic triumphs. As a concert pianist he has perhaps never been excelled. It is said that he showed the world how to perform feats in piano playing which before his time had been considered impossible. His compositions include works for the piano, organ, orchestra, and voice. He became a great teacher, counting among his pupils many of the greatest musicians of the 19th century. He became director of music to the Grand Duke at Weimar (Germany) and was decorated by every court of Europe.

The kindness and generosity of Liszt have become proverbial, as has also his appreciation for struggling young artists. Among many whom he befriended were Chopin, Berlioz, Schumann, and Wagner. The latter declared Liszt was the "one who first gave me faith in my work." Along with a warm heart and



FRANZ LISZT

nobility of character went all the eccentricities and vagaries of a temperamental genius. At the age of 50, withdrawing from the gay and brilliant circle in which he had moved, he received minor "orders" in

the Roman Catholic church and was afterwards known as Abbé. He died in 1886 at Bayreuth, Bavaria, where, as was his custom each summer, he was superintending the production of Wagner's operas.

A CHILDREN'S WORLD of BOOKS

LITERATURE FOR CHILDREN. Between the day of the 'Orbis Pictus' (the World in Pictures), the first picture book for children, and this Pictured Encyclopedia, millions of children's books have been published—some with pictures and some without, miniature books, medium-sized books, oversized books, thin books and thick ones, dull books and fascinating ones. Many of them were in such perishable form as to have vanished entirely; others which have survived are so precious that they are found only in the British Museum, in the library of a great university, or the private library of some fortunate possessor of old books, for early children's books are rarities of great interest to collectors.

In the preface to the 'Orbis Pictus', the author, Johann Comenius, the great educational reformer, states as the twofold purpose of his book "to entice witty children" and "to remove scare-crows from wisdom's garden." These delightfully prophetic words first appeared in High Dutch and Latin when the book was published in Nuremberg in 1657. Illustrated with crude woodcuts, it was translated by Charles Hoole into English the following year. Many editions were published in response to the interest aroused by the discovery that pictures are all-important in books designed for the pleasure of children in reading the world's story. The cuts for 'Orbis Pictus' were made by Michael Endter of Nuremberg, to whom Comenius wrote, and again prophetically, of the part pictures were to play in the making of books for children:

"This work belongs to you; it is entirely new in your profession. You have given a correct and clear edition of the 'Orbis Pictus' and furnished figures and cuts by the help of which the attention will be awakened and the imagination pleased. This will, it is true, increase the expense of the publication, but it will be certainly returned to you."

Pictures an Incentive to Reading

Discrimination in the choice of pictures which are to be an incentive to reading is a comparatively recent development of this very old method, but it plays an important part in any real consideration of literature for children. It is impossible to think of certain books apart from the pictures originally designed for them. They have been written into the book by the artist as well as by the author.

Sir John Tenniel's pictures for 'Alice in Wonderland' and A. B. Frost's for 'Uncle Remus', are outstanding modern examples of this written quality which may exist in an artist's work. A more recent example is



"There was a painful picture of a man being swallowed by a large fish." A picture from Rachel Field's delightful story, 'Hitty' (Macmillan).

taken from the illustrations by Dorothy Lathrop for 'Hitty', the adventurous tale of an American wooden doll of a hundred years ago, a book which in story and illustration has the charm of real literature for children of the present day.

The First Story-Books

The first story-books designed for children's entertainment were published in England in the middle of the 18th century by John Newbery, Oliver Goldsmith is believed to have been the author of the most

famous of them, 'The History of Goody Two-Shoes', (1765). In 'The Vicar of Wakefield', Goldsmith describes the genial publisher of these gay little books, bound in "flowery and gilt" Dutch paper, as "the philanthropic bookseller of St. Paul's Churchyard." An American reprint of this celebrated children's book was published by Isaiah Thomas of Worcester, Mass., and two copies of it are known to be still in existence in America. Leigh Hunt gives a boyhood memory of Newbery in 'The Town', and Charles Welsh wrote a life of him called 'A Bookseller of the Last Century'. Newbery published the first collection of Mother Goose rhymes in England, about 1760, under the title 'Mother Goose's Melody', or 'Sonnets for the Cradle'. In America, he is not only remembered by reprints of his books, but every year a medal bearing the name of John Newbery is awarded to the author of the most distinguished book published for children in the preceding year. The Newbery award was first made in the year 1922 to the author of 'The Story of Mankind', a book illustrated as well as written by Hendrik Van Loon, whose pictorial maps and animated drawings in color supply a desirable imaginative element in children's histories and books of travel.

The First Fairy Tales

Myths and fairy tales, poetry and song, are the bed-rock of literature. The first book of fairy tales written and published for children appeared in France in 1697, under the title 'Contes de ma Mère l'Oye' (Tales of My Mother Goose). Charles Perrault, a member of the French Academy and a friend of La Fontaine, retold some of the fairy tales, then so popular at the court of Louis XIV, for his own little son, who made a book for other children. Cinderella, Bluebeard, and Puss-in-Boots proved as fascinating to English-speaking children as to the French when they were translated some 30 years later. It adds an element of human interest to these fairy tales to know that it was the same Perrault, who, as a lawyer, claimed for the children of Paris their right to continue to play in the gardens of their kings—even in that of the Tuileries in the reign of Louis XIV when Colbert sought to reserve it for the king and his court. Perrault himself lived close to the Luxembourg gardens, where children still play the old games, sing the old songs, and watch the characters of the old tales he reclaimed for them live again in their little out-of-door theater under the trees.

The fairy tales of the Countess d'Aulnoy, a lady of the French court, were published in France at about the same time as those of Perrault, but were translated and published in England several years earlier (1707). Elizabeth MacKinty has illustrated in colors a selection of these tales in English, called 'The White Cat and Other Old French Fairy Tales'. She has imparted to her work a picture-book quality of French life of the period which conveys to children all the charm of stories some of their elders may consider too sophisticated for their reading. French

fairy tales of the 18th century and French picture-books of the 19th, notably those of Maurice Boutet de Monvel—'Vieilles Chansons', 'Filles et Garçons', 'Jeanne d'Arc', 'La Civilité'—La Fontaine's fables, and others have contributed not merely life and gaiety, but clarity and precision to the formation of a special literature for children which springs from life rather than from an ingenious plan.

Stories with a Purpose

John Locke had a plan which called for teaching children the alphabet and many other things by playing games. He invented many ingenious devices, but he did not lay as much stress upon books in childhood as he did upon games and physical training. He considered 'Aesop's Fables' the best book to put into a child's hands, and recommended choosing one with pictures in it. Unfortunately Thomas Bewick's fine woodcuts, implying more than the words, were not then in existence. The edition of the fables which Bewick illustrated was published about 1780. Locke knew that pictures were essential if children were to be attracted to reading the fables for themselves. He also recommended 'Reynard the Fox' as a book for children, but he warned parents against all fairy tales, romances, and ghost stories, as filling children's heads with "perfectly useless trumpery." Locke's plan of education gave the imaginations of children small chance to grow and stretch in childhood.

Later in the 18th century came Rousseau with another plan, embodying some of the same features with others entirely his own. Rousseau had great enthusiasm and the book he wrote, 'Émile' (1762), is more readable than Locke's 'Thoughts on Education' because it is written about a boy called Émile who has a tutor and spends his boyhood out-of-doors. Émile is allowed no books at all to read until he is 12, and then he is given 'Robinson Crusoe' and is supposed to relive Crusoe's experience.

To Rousseau, and to those who believed in his theories, Émile represented "the natural boy." Considerably more than a century later, Mark Twain provided a living natural boy who has since passed from the Mississippi River country to many lands. Huckleberry Finn bears very little relation to Émile, except that he shows how different a boy can be when he is drawn from life rather than made to fit into a theory. Rousseau's ideas created a great stir in France and England and led to the writing of many stories as well as essays to fit educational theories.

Thomas Day's 'Sandford and Merton' (1783) is a landmark among children's books with a purpose. Mr. Day, who was a friend of the distinguished writer on education, Richard Edgeworth, took his theory largely from Rousseau, but the life of his child characters was derived from a writer with a gift of humor and a sympathy with childhood far ahead of his time. Bad little Tommy and good little Harry of 'Sandford and Merton' are indebted to that small boy, Henry Earl of Moreland, who lives

in 'The Fool of Quality'. The author of this novel, Henry Brooke, reflects Rousseau's ideas, but for the first time he describes a boy with "a sense of fun" and he should be remembered for this notable achievement.

To this period also belongs Mrs. Trimmer's 'The Story of the Robins'. Originally published as 'Fabulous Histories', it represents one of the first attempts

to instil in the minds of children kindness to birds and animals, and presents an interesting point of comparison with the work of Thornton Burgess for children in the 20th century. Mrs. Trimmer was also among those who made liberal use of pictures to interest children in historical subjects, and certain pictorial charts and maps of the present day reflect her work.



This is the young Queen who was turned into 'The White Cat'.

But of all who wrote under the Rousseau impetus to child study, Maria Edgeworth stands out as the best story-teller. Her 'Parents' Assistant' is not a treatise, but a genuine story-book which has been reprinted again and again since it was first published in 1796. Sir Walter Scott, Ruskin, Anne Thackeray Ritchie, Agnes Repplier, and many others bear testimony to Miss Edgeworth's genius for invention and dramatization, and her command of English. Many of her stories are as good today as they ever were, for in writing for children she never failed to supply plenty of incident and clearly defined character and plot. Several of her stories, with an illuminating introduction by E. V. Lucas, are included in his 'Old Fashioned Tales'. This volume includes also a selection from 'Holiday House', by Catherine Sinclair—"the first children's book," says Mr. Lucas, "in which the modern spirit manifests itself." A comic giant appears in the story—"a giant so tall that he was obliged to climb up a ladder to comb his own hair"—a giant who is the forerunner of a glorious company of fun-makers such as Dr. Heinrich Hoffman with 'Struwpeter' (Slovenly Peter), Edward Lear with his 'Book of Nonsense', and Frank R. Stockton with his entertaining stories of giants, wizards, and good-natured griffins.



An enchanted footman holding 'The Pot of Carnations'. This and the other drawings by Elizabeth MacKinstry on this page are from 'The White Cat and Other Old French Fairy Tales' by Mme. La Comtesse d'Aulnoy, arranged by Rachel Field (Macmillan).

The First Folk-Tales

Before giants could appear as comic figures, they had to become naturalized in familiar folk-tales. The book which more than any other contributed to this end and to the shaping of a new literature for children of the 19th century was 'Kinder und Hausmärchen' (Children's and Household Stories), by the Brothers Grimm, published in Germany in 1812.

The two brothers who collected and wrote down these stories in many different dialects were scholars. Jakob, the elder, knew more about the history of words than any man of his day. Fully aware of the value of folk-tales as records of social life and of primitive scientific beliefs, they devoted 13 years to transcribing their stories without changing a word.

In one of the villages they found a woman with "a perfect genius for story-telling," says Jakob Grimm. "Her memory kept a firm hold on all sagas; she told her stories thoughtfully, accurately, and with wonderful vividness, and evidently had delight in doing it." From this woman, the wife of a cowherd, who became known as Gammer Grethel, they took down a large number of the stories which within a few short years became known the world over as 'Grimm's Fairy Tales'.



Hera is tha weak and greedy King from 'Graciosa and Percinet'.

For the first English translation of the tales made by Edgar Taylor, George Cruikshank did a remarkable series of etchings characterized by Ruskin as "unrivalled in masterfulness of touch since Rembrandt (in some qualities of delineation unrivalled even by him)." This edition, called 'German Popular Stories of the Brothers Grimm', published in England in 1823, drew an interesting letter from Sir Walter Scott in which he mentions the similarity of many of the stories to those he had heard as a boy, and adds, "There is also a sort of wild fairy interest in the tales which makes me think them full better adapted to awaken the imagination and soften the heart of childhood than the good-boy stories which have been in later years composed for them. In the latter case their minds

are, as it were, put into the stocks, like their feet at dancing-school, and the moral always consists in good moral conduct being crowned with temporal success. Truth is, I would not give one tear shed over 'Little Red Riding Hood' for all the benefit to be derived from a hundred histories of Jimmy Goodchild." This translation, commonly known as the Ruskin Grimm, is still in print, and contains Ruskin's admirable defense of fairy tales, as well as Scott's letter.

Ever since the Grimms produced their book, folklorists have been making similar collections for other countries, and wherever a native imaginative literature could still be found, as in Norway, revealed by the stories of Asbjornsen and Moe, in rural England by Joseph Jacobs, in Ireland by Scumas MacManus and Padraic Colum, in America by Joel Chandler Harris, literature for children has been proportionately enriched by a generous share in the discovery. As geographical boundaries have been extended, folk literature has become increasingly important—giving color and atmosphere to the study of life in different countries.

The Wonder Story

While the Brothers Grimm were still transcribing and accounting for the variants of the old fairy tales which bear their name, a child was born in Denmark who was destined to create not only new fairy tales, but a new form in literature as well.

Hans Christian Andersen put the stamp of originality on his fairy tales. Even the traditional stories of Scandinavia are always retold in his own manner, but the unique achievement of his invention is the wonder story, of which 'The Constant Tin Soldier' and 'The Nightingale' are typical. If Andersen was not the first to give life and personality to inanimate objects, it is he who has shown their independent existence in the most varied application to literature, and it is he who remains the master artist in this special field.

The first book of his 'Wonder Stories', published in 1835, contained only four stories, one of which was 'The Tinder Box'. Mary Howitt made the first translation of the stories into English, and Charles Dickens soon became a warm friend of the storyteller, who has been aptly characterized as the first great child in literature. It was a suggestion made by Dickens in reference to an old Arab proverb that prompted Andersen, some years afterwards, to write a remarkable story, 'The Beetle'.

But it was Thorwaldsen, the Danish sculptor, who begged for a story about a darning-needle, and for him, 'The Darning Needle' was first told. Thorwaldsen would stand laughing and listening to stories like the 'Top and the Ball' and the 'Ugly Duckling' as he worked. 'Ole Luckoie' (the Dream-Man) was composed in his company.

Andersen's autobiography, 'The Story of My Life', is full of similar interesting incidents, of travel, of friendship with kings and queens, actors and

singers, writers and artists of his time; and it also contains notes relating to the stories themselves. The stories were composed at intervals and published a few at a time over a period of nearly 40 years between 1835 and 1872. The first illustrated edition of Andersen's tales appears to have been published in Germany, the work of a Danish artist, V. Pedersen, who was found by Andersen at the request of his German publishers. The same illustrations appeared in the Danish edition of 1849, in an English edition of 1851, and in the author's edition published in America in 1870. Since Pedersen, many artists have sought to give pictorial expression to Andersen's stories. While illustrations may change, these dramas of life in miniature are as fresh in their humor and philosophy, their poetry and pathos, their imaginative charm, as when they were written nearly a hundred years ago.

Poetry and Childhood

It is in William Blake's 'Songs of Innocence', published in 1789, and in Wordsworth's 'Lyrical Ballads', published in 1798, that the beginnings of poetry for children and the first clear recognition of childhood as a distinct element in human life are to be found.

Having once discovered the "new continent of childhood in the spiritual world," poets and storywriters have been in communication with it ever since. Out of their combined efforts there has grown a special literature, prose and poetry alike, created for sheer joy of companionship with children, with birds and animals, earth and sky, sea and mountains and plain, as they appear to children.

This special literature is still a part of the general stream. To it belong Wordsworth's 'Alice Fell' and 'Lucy Gray', 'The Little Black Boy' and 'The Lamb' of William Blake, 'The Fairies' of William Allingham, Mary Howitt's 'Fairies of Caldon Low', Christina Rossetti's 'Sing-Song', Lewis Carroll's 'Alice in Wonderland', Stevenson's 'Child's Garden of Verses', Kipling's 'Road Song of the Bandar-Log' and 'The Seal's Lullaby', Alice Meynell's penetrating glimpses of children, Hilda Conkling's 'Poems of a Little Girl', W. H. Hudson's 'A Little Boy Lost', Walter de la Mare's 'Songs of Childhood', and his unique anthology, 'Come Hither', with its introductory essay and notes, sharing a poet's experience of reading poetry.

Anthologies designed purely to give children and young people a share in a variety of genuine poetry have been in process of making and remaking since the appearance of 'A Golden Treasury of Songs and Lyrics', selected by F. T. Palgrave and published in England in 1861; the 'Children's Garland from the Best Poets' made by Coventry Patmore and published a year later; and 'The Blue Poetry Book', selected by Andrew Lang, with its generous selection from the old ballads.

The 20th century anthology differs markedly from that of the 19th in its liberal inclusion of the

work of living writers, and its frank recognition of the creative intelligence of youthful readers who are making their own discoveries among the poets.

'This Singing World', compiled by Louis Untermeyer and the selection of modern poetry made by Marguerite Wilkinson for Lucy W. Thacher's 'The Listening Child', are good examples of modern anthologies published in the United States and containing a fair proportion of American poetry which children like to read or hear read aloud. 'Rainbow Gold', poems chosen by Sara Teasdale, is an admirable selection with a more limited appeal. 'Golden Numbers', with introduction and interleaves on the reading of poetry by Kate Douglas Wiggin, is one of the best of the standard collections.

Classics Retold

The first retelling of a classic to achieve a distinctive place in literature for children is 'Tales from Shakespeare' by Charles and Mary Lamb. The stories of 20 plays are included in the collection published in 1807 in two small volumes. Charles Lamb wrote the tragedies and Mary the comedies. Godwin, the publisher and proprietor of the copyright, had previously published several of the plays individually in sixpenny books with plates by Blake, "beautifully colored."

The Lambs had very special qualifications for this work. They had intimate acquaintance with the original, and strong feeling for Shakespeare's own words. They were discerning critics. They wrote without condescension, with great simplicity, and with a high regard for the intelligence of children. Among the "things in books' clothing" heartily detested by Charles Lamb were the didactic and moralistic books for children of the time.

Mary Lamb, as revealed by her letters and in 'Mrs. Leicester's School', has a singularly clear and charming style. These stories, autobiographical in form, are told by the children of a girls' school. They embody many childhood memories of the Lambs, and are now more often associated with the literature of childhood than with literature read by children.

'The Adventures of Ulysses', published in 1808, with a "superb frontispiece" by Corbould, was the work of Charles Lamb alone. It is a landmark among classics retold, but it is not as much read today as the 'Tales from Shakespeare'. There have been many translations from Homer since then, and the best of



'The Elves and the Shoemaker', one of the famous Cruikshank illustrations made for the first English translation of 'German Popular Stories of the Brothers Grimm'.

them, such as the prose of Lang, Leaf, and Myer, and that of George Herbert Palmer, are now claimed by the older boys and girls, the latter in a sumptuous holiday edition illustrated in color by N. C. Wyeth.

For the younger children, 'The Adventures of Odysseus' by F. S. Marvin, and Padraic Colum's 'Adventures of Odysseus' and the 'Tale of Troy' are excellent renderings in attractive modern form. Mr. Colum has done notable service in the field of retold classics from the Celtic and Norse, as well as from the Greek and from the oriental. A poet, a scholar, and a story-teller, who acquired his first taste for literature orally rather than from the printed page, his stories for children are characterized by directness and a dramatic quality. 'The Forge in the Forest'—his retelling of the old myths of Earth, Air, Fire, and Water—represents an unusual piece of collaboration with a Russian artist, Boris Artzybasheff, who interpreted each story as it was told and before it was written down. This book, published in 1925, set a new standard for modern illustrated books for children.

Ever since Hawthorne naturalized the Greek myths for American children in 'The Wonder Book' (1851), for which Walter Crane years afterward came over from England to make exquisite drawings in color, publishers have looked to the field of the retold and abridged classic as the basic source of

supply for children's books worthy of reissue in beautiful form.

There have been many distinguished contributors to this field—Charles Kingsley, William Morris, Sidney Lanier, Sir Arthur Quiller-Couch, Andrew Lang, Ella Young, James Stephens, and Walter de la Mare.

But the one who has exerted the strongest continuous influence, not alone in the field of the retold classic, but also upon the whole modern conception of book making for boys and girls, is Howard Pyle, an American painter of Quaker ancestry. Possessed of the instinct for selection and the power of pictorial imagination to make old tales and romances of chivalry live in new forms, Howard Pyle became the interpreter of a folk inheritance and an art tradition derived from many lands but conceived in the American spirit and attitude toward childhood and boyhood. These books, every one distinctive in design, beginning with 'The Merry Adventures of Robin Hood', a fine prose rendering of the ballads, and leading on to four volumes of King Arthur stories, extended over a period of years from 1883 to 1910. During this period, Howard Pyle was also vivifying the American scene with due regard for pirates and buccaneers. His books are a unique contribution to literature for children. They also afford a fine approach to the work of Dürer, whose influence may be clearly traced in Pyle's drawings (see Dürer).



The White Horse, the Goatherd, and the King, drawn by Boris Artzybasheff for 'The Forge in the Forest', a volume of romantic tales by Padraic Colum (Macmillan).

The Influence of the Novel

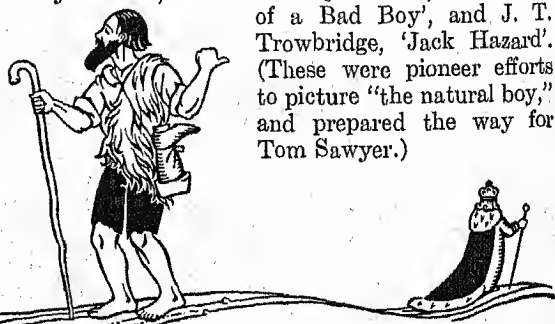
The novel has had its place in literature for children ever since 'Robinson Crusoe' appeared (1719), and children have had their place in the novel ever since Charles Dickens and Hawthorne, each in his own way, placed them there. Many a novelist, from Defoe to Stevenson, owes his continued popularity to boy and girl readers, or his place in memory to his power of portraying child character. Living characters and memorable atmosphere are prime qualities in such survivals, and this is true also of fiction written especially for children. Something of the novelist's skill must go into the writing of any good story for children, whether it be a tale of adventure by land, or sea, or air; a story of home or school life; a mystery story, a wonder story, or one with a background of history, or of life in another country.

Mary Mapes Dodge understood this requirement and met it in her story of 'Hans Brinker, or The Silver Skates'. Published in 1865, at the close of the Civil War, this true picture of life in Holland, with its genuine human interest in place of moralizing or preachment, became the touchstone for a new order of fiction for children which is American in origin and very appealing to children of other countries.

Mrs. Dodge first told 'Hans Brinker' to her two boys as a bedtime story when they were 10 and 12 years old. It grew out of her own absorbing interest as a girl in Motley's 'The Rise of the Dutch Republic', and her association with visitors from Holland.

'Hans Brinker' was received with enthusiasm. It was immediately translated into Dutch and regarded as the best book then available on Dutch life and customs, as one of the Dodge boys discovered when he visited a bookshop in Amsterdam. Eight years after the publication of 'Hans Brinker', a new magazine for children was started in New York and Mrs. Dodge became its first editor. "A child's magazine is its playground," she declared, and assisted by the incomparable Frank Stockton, she proceeded to make of *St. Nicholas* a playground so spacious as to include children in all parts of the world.

Direct communication with the children themselves had already been established by two earlier magazines. The first of these was *Our Young Folks* (1865-73), for which Mrs. Diaz wrote 'The William Henry Letters', Thomas Bailey Aldrich, 'The Story of a Bad Boy', and J. T. Trowbridge, 'Jack Hazard'. (These were pioneer efforts to picture "the natural boy," and prepared the way for Tom Sawyer.)



In the *Riverside Magazine* (1867-70), of which Horace E. Scudder was editor, a dozen or more of Hans Christian Andersen's stories had been published before their appearance in Denmark or England. Mr. Scudder, who afterward edited the *Atlantic Monthly*, secured illustrations of unusual quality and variety for the *Riverside*, and established a tradition of well-chosen selections out of world literature which he embodied later in his collection, 'The Children's Book' (1881), and in his essays, 'Childhood in Literature and Art'.

There were other influences also, and Mrs. Dodge was fully alive to them all. In 1868 Louisa Alcott had given the whole world a home story in her 'Little Women'. *St. Nicholas* profited by this event, for Miss Alcott became one of its first contributors. As no writer seemed too distinguished to be asked to write for *St. Nicholas*, no writer with a good story to tell was denied a place there. Kate Douglas Wiggin, young and unknown, had a story accepted, and years after Rebecca of Sunnybrook Farm had taken her place among girl characters, she paid tribute to an editor who understood both writers and children.

Mark Twain's 'The Prince and the Pauper' first appeared in *St. Nicholas* and so did Frances Hodgson Burnett's 'Sara Crewe', and Ruth McEnery Stuart's 'Babette', a story of New Orleans. When Rudyard Kipling inquired if he was not to be asked to contribute, he received this challenging reply, "Are you sure you are equal to it?" Kipling, recalling how he and his sister used to seramble for *St. Nicholas* as boy and girl, retaliated a few weeks later by bringing 'Rikki-Tikki' and 'Toomai of the Elephants' to Mrs. Dodge's home in the Catskills. Thus began the 'Jungle Books'.

In this genial and stimulating atmosphere, creative writing and drawing for children grew and thrived and became a powerful influence in the formation of

that special type of literature for children known as "American stories." Stories ranging from thrilling accounts of Indians and pioneers to tales in which resourceful, adventurous boys and girls took part were bound to seem real because of their truth to life.

The story of the making of books for children and

youth is a fascinating one and without an end. There must ever be a selection from the old of what is imperishable, and from the new of that which has the breath of the life of the rising generation. In making this selection the children's library idea has been a significant factor in the development of a special literature for children. Since 1918, children's books have been accorded a definite place in American literary criticism in such leading reviews as *The Book Review* of the *New York Times*, *Books* of the *New York Herald-Tribune*, and *The Horn Book*, a magazine devoted entirely to children's books and published in Boston.

An increasing interest in children's books from foreign countries in both Europe and America was brought to a point by the publication in 1929 and again in 1932 of a list called 'Children's Books and International Good

Will.' Sponsored by The International Bureau of Education in Geneva, it lists the books of 42 countries.

Recent Forward Steps

In 1937, years of research by American children's librarians resulted in a bibliography called 'Children's Books from Foreign Languages.' Published by The Wilson Company, it lists the books of 39 countries that have been translated into English.

The most forward step in this direction was taken by Czechoslovakia, the country of Comenius, while it still had national independence. Here children's books and their illustration were made by governmental provision a subject of critical study. There is an excellent survey of Czech children's books in a book called 'Czech Children's Literature', and a



'Alice and the White Knight', a picture by Sir John Tenniel for Lewis Carroll's book 'Through the Looking Glass' (Macmillan).

critical magazine, *Uhor*, appraised the children's books of the year in individualized reviews by specialists.

Good Books on Literature for Children

Reading with Children. By A. T. Eaton. (Viking, 1940.) An extremely human and reliable record of long experience in sharing the joys of reading with children of all ages.

My Roads to Childhood. By A. C. Moore. (Doubleday, 1939.) Readable essays on the writing, illustration, and criticism of children's books. Annotated lists for various ages are a feature of this book.

Books for Boys and Girls. Edited by L. H. Smith. (Ryerson Press, 1940.) A critically annotated selected list of 2,500 children's books published in Great Britain and the United States.

What Shall the Children Read? By Mrs. L. E. H. Richards. (Appleton-Century, 1939.) A brief but wise and witty treatment of the subject by an author with a lifelong knowledge of books and children.

A Guide to Literature for Children. By W. T. Field. (Ginn, 1928.) Pays special heed to illustration. Contains an excellent chapter in defense of "Mother Goose".

Realme of Gold in Children's Books. Edited by Bertha Mahony and Elinor Whitney. (Doubleday-Doran, 1929.) An illustrated catalog of children's books with informing notes about authors and artists, and extracts from the books themselves.

The Three Owls Third Book. Written and Edited by A. C. Moore. Illustrated. (Coward-McCann, 1931.) Contains critical appraisals of children's books (1927-30). Notes on artists. List of 100 distinctive books of a decade.

Children's Books in England; Five Centuries of Social Life. By F. J. H. Darton. Illustrated. (Macmillan, 1932.) A readable history of children's books by the best known English writer on the subject. Throws a publisher's searchlight on many specific books published in the 18th and 19th centuries.

LITHOGRAPHY. Most printing is done from type or designs which project above their background, so that they alone receive the ink or touch the paper on which the printing is done. In lithography, however, the printing is done from a smooth surface on which the writing or design is drawn with a greasy substance, or is produced by photography. This latter form of lithography is called photolithography.

This method of printing was invented about 1796 by a Bavarian playwright, Alois Senefelder (1771-1834). It got its name from the Greek words meaning "stone" and "writing," because stone was for long the only satisfactory surface. Today specially prepared plates of zinc or aluminum are often preferred. The design may be made directly on the plate with oily crayons or may be drawn on paper and transferred to the plate by pressure. A mixture of gum arabic and acid is then applied. This "fixes" the design and cleans all grease from the other parts of the plate, "etching" them slightly. To print from this plate, water and then a special greasy ink are applied in succession. The water moistens the etched or "empty" parts of the plate but is repelled by the oily design; the ink, on the contrary, clings to the design but is repelled by the remainder of the plate.

By using a separate plate or stone for each color, *chromo lithographs* of colored designs can be made. In *photolithography*, the design is produced on the sensitized surface of the plate by methods similar to those used in photo-engraving. The "offset" method of printing lithographs consists in impressing the design from the plate to the surface of a rubber-covered cylinder, which in turn transfers it to the paper. This permits printing on rough-finished paper, instead of the smooth paper required for "direct" printing. (See Engraving.)

Lithography plays an important part in modern commercial printing, but, like engraving, it is also a

medium for artistic expression. Many very able men turned to it, once it was invented, and many of the best living artists have joined in its 20th-century revival. Adolph Menzel in Germany kept it alive for illustrating books into the late 1860's. In France, it was used by such a genius as Honoré Daumier, notably in his caricatures. Ignace Fantin-Latour produced a famous series of lithographs inspired by Wagner's music. Francisco Goya's grim and brilliant subjects, especially his bull-fights, are masterpieces of the art. In England, Samuel Prout did superb lithography. Among Americans, Whistler had an important part in its revival. For posters, particularly war posters, the process has been used by many artists, among whom are Spencer Pryse, Henry Bone, Louis Raemakers, Joseph Pennell, and George Bellows.

LITHUANIA. The Middle Ages saw Lithuania rise from a small pagan duchy to the largest state in Europe, spreading from the Black Sea to the Baltic. In the 12th century the Poles and the German Knights of the Teutonic Order sought to christianize Lithuania with fire and sword, but the Lithuanians fought them off. Politics succeeded, however, where force failed, and Lithuania was united to Poland by a marriage in 1386, and by a convention in 1569. In the 18th century it was divided between Russia and Prussia through Poland's partition (*see* Poland). Not until the fall of the Russian Empire in 1917 did the Lithuanians regain their independence—only to be taken over again by Russia in 1940.

In shape Lithuania is a small triangle, with its western point on the Baltic Sea. Latvia lies to the north, Germany to the west, and Russian Poland to the east. Forests and marshes cover much of the land; less than half of it is fit for the plow. Rye, oats, barley, wheat, potatoes, and flax are the leading crops. Stock raising, dairying, poultry farming, and beekeeping are important. Three-fourths of the population of about 3,000,000 is engaged in agriculture. The area is more than 20,000 square miles.

The Lithuanian language is an Aryan tongue, similar to that of the Letts. Education is compulsory and almost nine-tenths of the people can read and write. The majority of the population is Roman Catholic.

Lithuania's history from the time it proclaimed its independence in 1918 until it rejoined Russia in 1940 was exceptionally stormy. It lost its traditional capital Wilno (Vilna) to Poland in 1923, and the seat of government was then moved to Kaunas (Kovno). In March 1939 it was compelled to cede to Germany the Baltic port of Memel (Klaipėda). In October Lithuania granted military concessions to Russia, receiving in return its old capital Wilno, which Russia had taken from Poland. Upon the vote of its Soviet-dominated parliament, Lithuania in August 1940 became the fourteenth republic of the Soviet Union. Wilno became the capital. (*See also* World War, Second.)

LITMUS. When a chemist wishes to learn whether a solution is acid or alkaline, he tests it by putting into it a bit of paper containing the chameleon-like coloring

matter called litmus. Blue litmus paper is turned red by most acids; red litmus paper is turned blue by alkalies or bases. Litmus is manufactured chiefly in Holland from lichens. The lichens are ground to a pulp with water, and potassium carbonate and ammonia are added. The mass gradually assumes a blue color. Chalk or gypsum is added to render the mass thick enough to be formed into rectangular cakes, which is the form in which litmus is marketed.

LIVER. In all animals that have a backbone, as well as in some that do not, there is a large gland called the liver, which serves as one of the digestive organs. The liver in man is situated in the abdominal cavity, on the right side slightly above and behind the stomach. It is the largest gland organ of the body, weighing from three to four pounds and measuring about six or seven inches from front to back, and about twelve inches from right to left.

The liver has four main functions: (1) It produces bile, which aids in the digestion and absorption of fats, and is the vehicle that carries some waste material from the body. (2) Glycogen (or animal starch) is formed from the sugar in the blood and stored away in the liver cells, to be given out again as sugar when it is needed. (3) The liver, during the digestive process, forms *urea*, one of the wastes of the human body, which must be thrown off (*see* Kidneys). (4) The liver also has an important duty in preparing fats for oxidation in the body.

Blood flows into the liver from two main sources. The small hepatic artery brings blood directly from the heart to feed the liver itself; the large portal vein brings all the venous blood from the stomach and intestines to the liver before it goes back to the heart. The liver makes important changes in this blood before it passes on to the general circulation.

Just below the liver is a small pear-shaped sac, known as the gall-bladder. This is used as a store-room for the bile. The common bile duct conducts bile to the intestine just beyond the stomach.

LIVERPOOL, ENGLAND. Throughout the modern history of Great Britain, in war and peace, this great port has played a vital rôle. In wartime its wharves are piled high with munitions and supplies from overseas; and that is why it was bombed so fiercely by the Germans in 1940 and 1941, during the European war. In normal times its harbor presents a different picture—of peaceful merchantmen trading with all the world.

In one dock and another vessels are unloading wheat and wool from Australia, cotton from Egypt, grapes and wine from Spain, tea from Calcutta, rubber from the East Indies, and cotton and gasoline from Texas (the American trade is naturally important owing to Liverpool's situation). Fleets of the largest passenger ships afloat drive hither and yon from Liverpool to all the great ports of the world, and the fortress-like warehouses at the end of the docks house goods from the ends of the earth.

In contrast with New York, which has a fine natural harbor developed piecemeal in the wake of traffic needs, Liverpool has a poor natural harbor which, by centralized control and carefully planned effort, has been developed into the second seaport of the British

WHERE LIVERPOOL'S FORTUNE LIES



The wealth of this great seaport rests upon the tremendous commerce which passes over its docks. In the lower left-hand corner of this picture you see the southern end of the great floating landing stage where passengers embark and disembark.

Empire and the leading port of Great Britain for export trade. Its facilities are systematically kept several years in advance of the demands of commerce, so that it is always ready to handle increased business.

The Mersey estuary, on which Liverpool is built, suffers from shifting sand-bars across the channel, and from a tide with a range of 26 feet. To remove the sand the Dock Board keeps a fleet of dredges constantly at work maintaining a 30-foot low-water channel. The advantages of a tideless harbor have been secured by a wonderful system of "wet docks," operated like the locks on a canal. When a ship enters one of these basins, a water-gate closes behind it and remains closed, holding the water at a constant level, until the ship is ready to sail. The 66 docks together have a water area of 600 acres and quayage 30 miles in extent. The new Gladstone docks, which include the world's largest dry dock, have 56 acres of water space and 2½ miles of quayage. They cost \$35,000,000.

The system of warehouses is equally extensive. The tobacco warehouse at Stanley Dock, with its 14 stories and 36 acres of floor space, is said to be the largest in the world. At Herculanum Dock a petroleum reservoir of 60,000 gallons' capacity has been hewn out of the solid rock.

The great floating landing stage is really a half-mile raft supported on floating pontoons. Officially, the northern half is devoted to ocean and coast steamers, while the southern part is for ferry traffic; but its 80-foot width permits it to be used as a street, a promenade, and a pleasure park. The whole system of docks, quays, and warehouses is public property under the control of the Mersey Docks and Harbour Board, briefly known as the Liverpool Dock Board.

Liverpool lies wholly on the east side of the Mersey, but the Dock Board also controls the docks on the west or Birkenhead side, which do a large cattle import and coal export trade. All these vast and costly improvements have been made by the Port Authority without aid from the city or from Parliament. In fact, the show building of the city, St. George's Hall, was built for the local music festivals and assize courts out of a surplus from the income of a few early docks.

Liverpool has many manufactures, but it does not owe its importance to them. Its fortune has always lain on the water, even in the ancient days when a safe beaching ground for fishing boats, out of the swift currents of the Mersey, was afforded by a shallow little tributary, the Pool. A few fishermen, whose huts huddled near the present site of the Liverpool Town Hall, paid tribute to the lords of the manor of West Derby. The Pool was long since filled up; West Derby has shrunk to a suburb; but the great metropolis of Liverpool, with its 855,000 population, lives today by grace of the Mersey, as did the fishing hamlet eight or nine centuries ago.

Liverpool's commercial importance began late—with the Stuart Restoration in the 17th century—and it had to outstrip first Chester and then Bristol before its position became commanding. In the latter half of the 18th century, the power loom began to make Lancashire the world's greatest cotton-manufacturing center; and Liverpool its chief port. Raw cotton is still the chief import, and the cotton goods of Manchester and other Lancashire towns the chief export, though some trade is now diverted through the Manchester Ship Canal. The woolen goods and other

manufactures of the West Riding of Yorkshire also find an outlet through Liverpool.

The University of Liverpool is world famous for one department, the Liverpool School of Tropical Medicine, which has sent many expeditions to Greece, Brazil, Central Africa, and other warm countries to study malaria, yellow fever, sleeping sickness, etc.

Birkenhead, across the Mersey from Liverpool, has immense engineering and ship-building plants, notably Laird's Shipbuilding Works, in which were built vessels for the Confederate navy during the American Civil War. It is a separate municipality from Liverpool, with a population of about 150,000 of its own. **LIVERWORTS.** The next time you notice a flat, creeping, rather fleshy-looking plant, with rounded lobes to its leaflike body, examine it carefully. It is probably a liverwort—a simple flowerless plant, one of the first land plants in the earth's history. The liverworts got their name from their shape, which in some varieties looks a little like that of the human liver, and perhaps also from the fact that they were once believed to be beneficial in diseases of the liver.

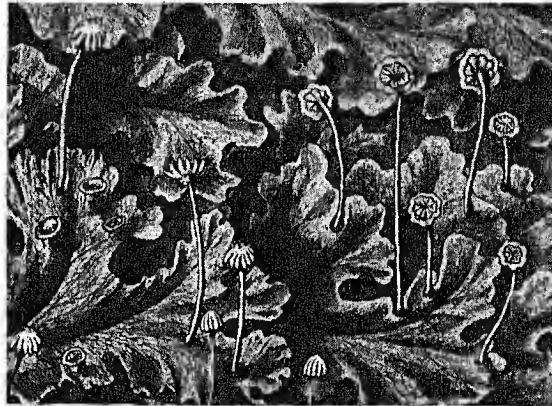
They are usually of a bright green hue, and they grow most luxuriantly on wet rocks, logs, or on the ground in ravines and other moist shady places. Many are so small they are easily overlooked. They are much like mosses and are often confused with them. Others are large and conspicuous, with their upper surface green, and the lower surface covered with numerous fine white hairlike rootlets called "rhizoids." Some of these liverworts have little green cuplike organs, called "cupules"

(Latin for "little cups"), containing tiny greenish balls, known as "brood buds," or "gemmae," which grow into new plants.

The liverworts have also another mode of reproducing, by growing tall umbrella-like organs, some of which (called archegonia) bear little eggs; while others (antheridia) bear very tiny actively swimming cells, called "sperms." During wet weather the sperms swim to the archegonia and there fertilize the eggs, which grow into tiny plants, rooted in the archegonium, and containing many very small brownish spores. These spores fall upon the ground and there grow into liverwort plants again, and so the cycle goes on from generation to generation.

The liverworts and mosses together compose the second great division of the vegetable kingdom, the *Bryophytes*, the liverworts forming the group *Hepaticae*.

WHY THE LIVERWORTS HAVE THEIR UMBRELLAS UP



The Liverworts, as you learn in the article, put their "umbrellas" up, not because it is raining but because they want it to rain! In some of these umbrellas eggs are carried, in others little male cells, and during the wet weather the little cells swim from the other umbrellas and fertilize the eggs.

The GREAT MISSIONARY EXPLORER of AFRICA

LIVINGSTONE, DAVID (1813-1873). How does it feel to be crunched in the jaws of a lion? Dr. Livingstone, the noted British missionary and African explorer, was one of the few men who knew from personal experience and lived to tell the tale.

Soon after he began his work in South Africa he was sent to establish an advanced station in the heart of the wilderness some 800 miles northeast of Cape Town. The "charming valley" which he and his white companion chose proved to be infested with lions, which attacked the herds by day and leaped into the cattle pens at night. At a distance of 30 yards Dr. Livingstone fired two bullets into one of these ferocious beasts, severely wounding it. Then with a roar it hurled itself upon him, crushing his left shoulder in its jaws, and bearing him to the ground.

"Growling horribly close to my ear," wrote Livingstone, "he shook me as a terrier dog does a rat. The shock produced a stupor similar to that which seems to be felt by a mouse after the first shake of a cat. It caused a sort of dreaminess, in which there was no sense of pain nor feeling of terror, though I was quite conscious of all that was happening."

Fortunately the lion soon left Livingstone to attack his companion, and presently fell dead of its wound. Livingstone's shoulder was so badly crushed that it troubled him the rest of his life.

But neither dangers of this sort, nor hunger, fever, attacks by hostile Boers or native cannibals, the perfidy of Arab slave traders, nor any of the countless

perils that beset him could dampen his ardor, or make him abandon his chosen field. His patient resourcefulness, courage, fair dealing, and Christian character laid the basis for missionary work over a large part of South and Central Africa. In addition, no other explorer ever did so much for African geography as Livingstone during his 30 years' work. He remade a large part of the map of the Dark Continent, and laid the foundation for the British title to the districts of Bechuanaland and Rhodesia.

A poor Scotch lad, Livingstone had to go to work in a cotton mill at the age of ten. With the first money that he earned he bought a beginning Latin book. Although work at the factory began at six in the morning and lasted ten hours or more, he attended night school and studied at home until he had read Vergil and Horace. At the factory he kept a book open where he could read a sentence now and then as he went about his work.

In his 20th year he was thrilled by reading an account of a missionary's labors in Asia, and, as he says, "resolved to devote my life to the alleviation of human misery." Then followed college classes in Glasgow, examination and acceptance by the

London Missionary Society in the great English metropolis, the completion of his medical education in London, with studies of theology, botany, zoölogy, geology, chemistry, and astronomy—all with a view to his future life-work. At last came his arrival at Cape Town in South Africa in 1841.



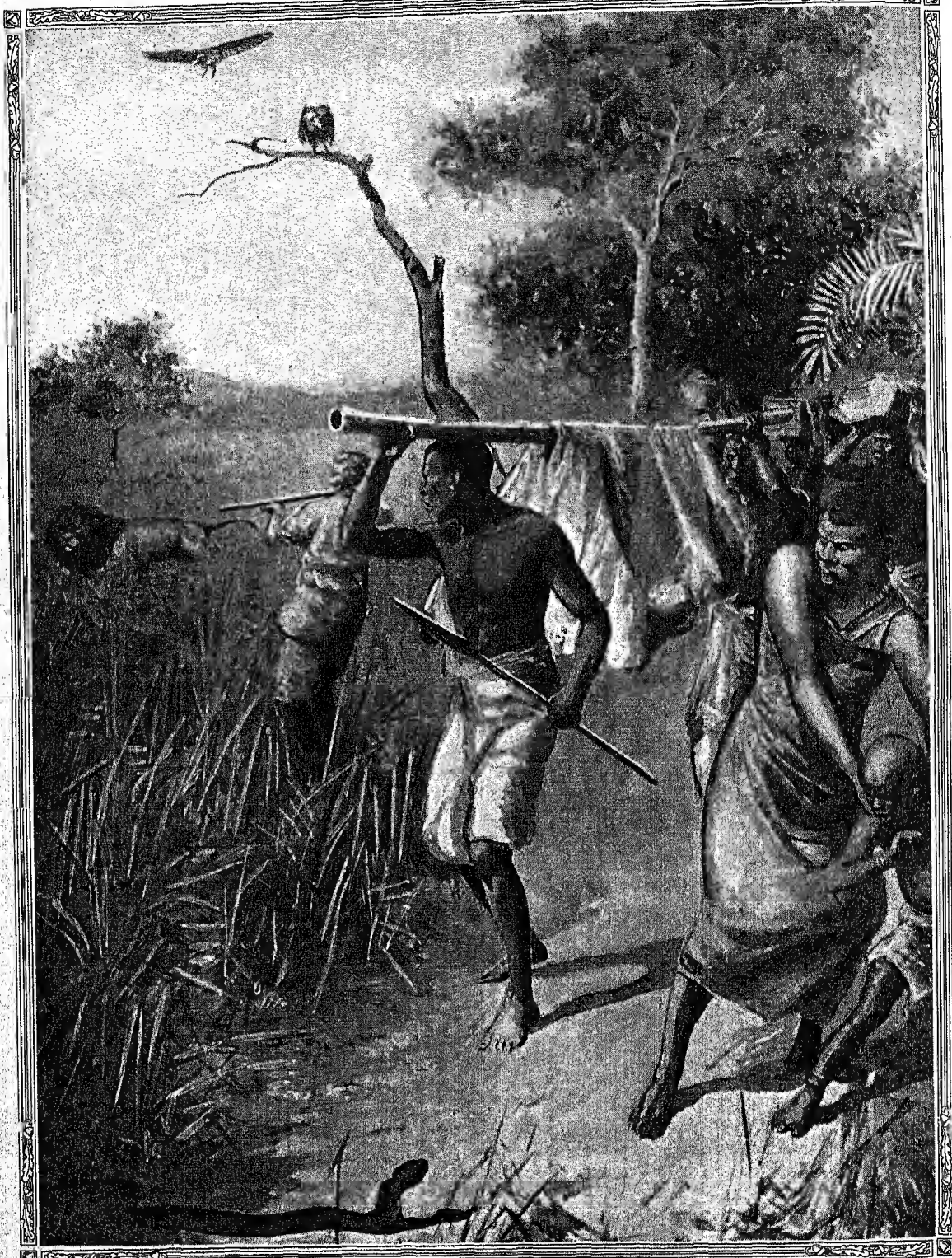
DAVID LIVINGSTONE

THE SHOT THAT SAVED LIVINGSTONE'S LIFE



The lion had struck down the missionary and had torn his shoulder, inflicting the wound which troubled Livingstone all the rest of his days. Another stroke of those great claws or a bite from those jaws, and Livingstone's noble career would have been ended. But the missionary's friend fired at this moment, and the beast was drawn to attack his new adversary. Weakened by earlier wounds, the lion soon fell dead.

THE LAST SAD JOURNEY TO THE SEA



It was a scene worthy of the epic grandeur of Livingstone's life of sacrifice and service in the African wilderness that his body should be carried to the sea in this way by his devoted black servants through 1,000 miles of savage waste. This picture shows the perils through which his followers passed on that long sad journey. See that brave fellow in the lead, with his spear ready in case the man with the rifle should fail.

For over 30 years Dr. Livingstone traveled up and down Africa, from the Cape nearly to the Equator, and from the Atlantic to the Indian Ocean. He discovered the Victoria Falls of the Zambesi River, Lakes Nyasa and Mweru, and Lake Bangweulu, where he afterward died. He also discovered the upper course of the Congo, called the Lualaba, but he believed it to be the upper Nile. His wife shared many of his travels. She was the daughter of a missionary and was born in South Africa. His children too were born on that continent. Livingstone's small salary and the money that he made from his books went to equip new expeditions. But for his iron constitution and his power of inspiring loyalty and affection in the natives he would never have survived his first years in Africa. During the last 15 years of his life he was aided by the British government, from which he held a roving appointment as consul.

Two great objects cherished by Livingstone were the stopping of the Arab slave trade in Africa, which he called the "great open sore of the world," and the discovery of the sources of the Nile. The descriptions of the horror of the slave raids which he sent to England helped in time to stamp out this horror. He never found the sources of the Nile, though he perished in the attempt.

About a year and a half before he died, an expedition sent by the New York *Herald* under Stanley (see Stanley, Sir Henry Morton) found him at Ujiji on Lake Tanganyika, in the midst of great privations and weakened by fever, following the desertion of some carriers with supplies and his precious medicine chest. Stanley tried to persuade him to return to civilization, but he refused. After the relief party had left, Livingstone again started west, looking for the sources of the Nile. His old enemy dysentery attacked him, with complications brought on by excessive hardships, and he grew steadily worse. On the morning of May 1, 1873, his men found him kneeling beside his cot, dead. His faithful native attendants, who loved him, preserved the body in salt, and carried it to Zanzibar. It was taken to England and buried with honors in Westminster Abbey. A monument stands on the spot where he died.

Livingstone's books include 'Missionary Travels and Researches in South Africa' and 'The Zambesi and Its Tributaries'. He is the subject of many biographies, notably: 'David Livingstone', by Thomas Hughes; 'Personal Life of David Livingstone', by W. G. Blaikie; 'Stanley and Livingstone in Africa', by J. T. Headley; 'David Livingstone: Explorer and Prophet', by Charles J. Finger; 'Story of David Livingstone', by William Livingstone; 'David Livingstone', by R. J. Campbell, and 'David Livingstone: the Weaver Boy Who Became a Missionary', by H. G. Adams.

The SCALY DRAGONS of MODERN TIMES

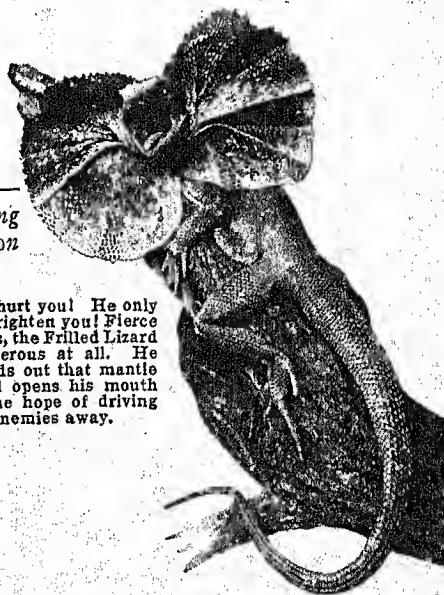
A Visit to Lizard Land with Its Queer Ugly Inhabitants—Their Usually Harmless Disposition—Some of Their Startling Habits, Such as Dropping Off Their Tails and Running on Their Hind Legs—Monster Lizards Twelve Feet Long

LIZARDS. If you had in a cage a specimen of each of the 2,500 different kinds of lizards that have been found in the world, it would be hard to believe that animals of such widely different shapes, sizes, colors, and habits could possibly belong to the same big group of reptiles.

You would see tiny creatures two or three inches long lying beside giants measuring seven or eight feet. Bright greens, blues, and reds would stand out among dull grays, browns, and blacks. Most of them would show four sturdy legs, with long toes, and even claws; but there would be some with only front legs, some with only back legs, and some with no legs at all. Tree-lizards, ground-lizards, underground-lizards, and water-lizards would be mingled together, some darting about with the speed of lightning, others lying sluggish and still.

Here and there you would find a sleek, slender, graceful creature, but most of them would probably impress you as misshapen, horny, repulsive monsters, like figures from a bad dream. Yet, if you judged by looks alone, you would do the lizard tribe an injustice, for in spite of their forbidding

He won't hurt you! He only wants to frighten you! Fierce as he looks, the Frilled Lizard isn't dangerous at all. He just spreads out that mantle of his and opens his mouth wide in the hope of driving his enemies away.



appearance, only two of the 2,500 species are poisonous—the "horrid heloderma" of west Mexico, and the "Gila monster" of southwestern United States. Many members of the tribe are not only harmless but easily tamed and exhibit a goodly degree of intelligence in captivity, learning simple tricks and answering to calls.

Present-day lizards are blood brothers of the snakes, and together these constitute the order *Squamata* of the reptilian class of animals. Their rela-

tionship can be traced through many details of internal anatomy and is very close, in spite of the great difference in external appearance.

Never Gets Too Hot for Mr. Lizard!

While lizards are found in nearly all parts of the earth, except the polar regions, they reach their greatest numbers and varieties in tropical lands. Most of them catch living prey, the smaller ones feeding on worms and insects, the larger ones devouring mice, frogs, other lizards, snakes, young turtles and crocodiles, fish, water-birds, and, in fact, almost any animals they can overpower.

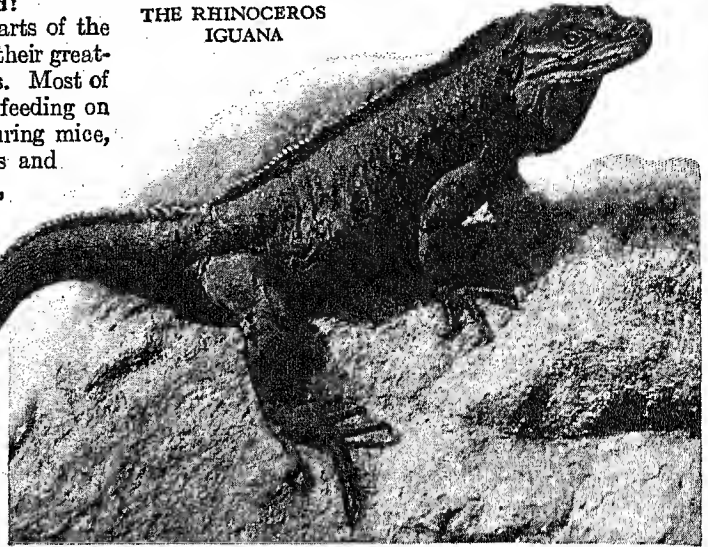
There are some important varieties, however, that prefer a vegetable diet, notably most of the larger members of the "iguana" family of tropical America, some of which reach a length of six feet (see Iguana).

Perhaps the most amazing peculiarity found in the lizard tribe is the faculty which many of its members possess of casting off their tails. When seized by a foe from behind, the tail breaks off at one of the joints of the back bone. The severed part continues to wriggle for some time, catching the attention and satisfying the hunger of the pursuing foe, while the more important part of the lizard escapes. Some species will abandon their tails even before they are seized. Such mutilation seems to cause them no inconvenience, for they at once set about growing a new tail. Not infrequently they produce by way of consolation two or three new tails in place of the one they have lost.

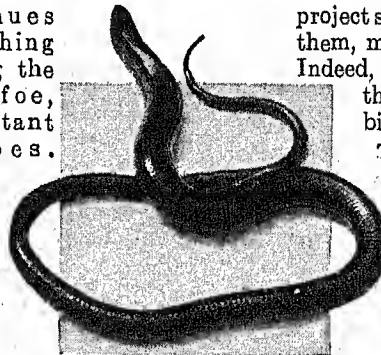
Another strange practice among certain large lizards, notably the frilled lizard of Australia and the "teguexin" of the West Indies and South America, is that of running

swiftly and for great distances on their hind legs. When doing this, their front legs swing back and forth like the arms of a human runner and their tails

THE RHINOCEROS IGUANA



This member of the Iguana family gets its name from the two little horny bumps on its nose. Notice the pouch at the neck which is characteristic of the whole Iguana family.



SNAKE? NO, IT'S A LIZARD
Although this creature is called the "Glass Snake," it is really a lizard which has lost the faculty of growing legs.

project stiffly backward and upward to balance them, making them look like strange birds. Indeed, the whole performance recalls sharply the fact that millions of years ago birds emerged from reptilian ancestors.

The "Flying-Dragons" of the Malays

The nearest thing to flying found among the lizards, however, are the long sailing leaps from tree to tree performed by the small "flying-dragons" of the Malay countries. The "wings" of these creatures are unlike any other animal organs, for they are formed by the outward extension of the ribs, which are connected by thin membranes of skin. When at rest, they lie close to the creature's sides, but when a leap is made, they spread out like fans, supporting the lizard like a parachute as it glides through the air. Often these "gliders" are brightly colored like the wings of a butterfly.

The frilled lizard mentioned above gets its name from the broad collar of loose skin it wears around its neck, which it spreads out like an umbrella when frightened or angered, at the same time opening its mouth wide and hissing most venomously—all of which is pure bluff. Such scarecrow tricks are common among lizards. The "hooded basilisk," which is named after the fabled

ONE OF THE BIG "MONITOR" FAMILY



The Monitor lizards are among the largest of their family. While they never seek trouble, they have fierce tempers when attacked, biting their foes and lashing them with their long tails.

monster that was supposed to strike men dead with its glance or with its breath, is a conspicuous example of such "frightfulness." Being about three feet long, and possessing jagged crests which it can raise at will on its head, back, and tail, this harmless creature is an object of terror to the native children of Central America.

But we must not imagine that all lizards are equally placid in their disposition. Though non-poisonous and inclined to mind their own business, some of them are fierce fighters and biters when annoyed. This is particularly true of the "monitor" family, whose members are scattered through Africa, Arabia, southern Asia, and Australia. The largest of all the lizard tribe is the giant lizard of Komodo (in the East Indies), which is said to reach a length of 12 feet or more. Like all the monitors, it has a long whiplike tail with which it lashes and cuts its assailants when it is unable to reach them with its sharp and powerful teeth.

In contrast with this vigorous and short-tempered creature are those most helpless of all lizards, the "glass-snakes," sometimes called "blind-worms" or "slow-worms," and the strange "amphisbaenas." Both are devoid of legs, although some possess useless external flaps in place of feet. The former is, of course, neither a snake nor a worm, nor is it blind. Its small bright eyes are equipped with eyelids, a thing unknown among true snakes. The "glass" part of its name arises from the fact that it becomes rigid when captured and breaks off at the tail if not handled very gently. Even more unlike the typical lizard is the amphisbaena, which has eyes and ears both concealed by skin growths, which lives in the ground, and which can move backward or forward with equal ease like an earthworm.

Although most of the lizards have no voice beyond an angry hissing, the night-loving "gecko" family is

UP AND AWAY!



This rear view of a Frilled Lizard shows the curious way in which it runs on its hind legs, swinging its arms like a human runner, and throwing its tail from side to side to balance itself.

distinguished for its ability to emit a variety of cries, all resembling more or less the sound from which they derive their name. The geckos are small creatures, very useful for the number of insects they destroy. Some are sand-runners, others tree-dwellers, and a few varieties penetrate dwellings in search of food. These have feet equipped with tiny pads and hairs which enable them to climb up a pane of glass or walk on a smooth ceiling.

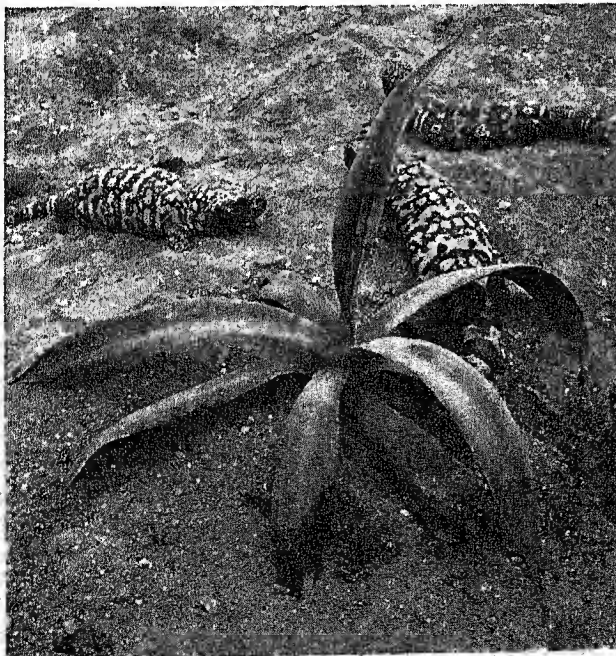
While the geckos have been in many lands unjustly persecuted from the popular belief that they spread mysterious poisons, another group of small lizards, the "skinks," have been regarded from the earliest times as possessed of equally mysterious medicinal properties. The head and feet of the common sand-burrowing skink were preserved in wine and imported in great quantities to ancient Rome. The Arabs of today still use them as medicine and food. Nor is this the only example of lizards being eaten by man, for the iguanas of America and many Australian, Asiatic, and African species are highly relished by the natives.

Among the best known of North American lizards are the poisonous "Gila monster" and the gentle friendly "horned toad." The former, which sometimes reaches a length of two feet, was first

found in the Gila River valley in Arizona. Its sluggish body is marked with big orange blotches and rings on a black background. The poison-sacks lie near the root of its grooved teeth, and its bite quickly kills the small animals on which it preys. In rare cases it has been fatal to man. Its near relative the "horrid heloderm" bears yellow instead of orange spots.

The "horned toad," so called because of its flat, squatty, toadlike body, dwells throughout the dry plains and deserts of the western and southwestern United States and in Mexico. It is covered with a multitude of

THE VILLAINS OF LIZARD LAND



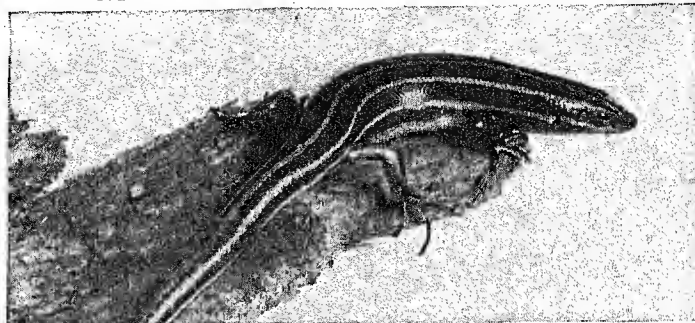
These Gila Monsters, and their cousins the "Horrid Heloderms," are the only poisonous kinds of lizards. They dwell in the dry southwestern parts of the United States and in Mexico.

short sharp spines, particularly about the head, which protect it chiefly against being swallowed by snakes. These small creatures make interesting pets, feeding readily on flies and ants and drinking large quantities of water if it is sprinkled into their cages like rain drops. They belong to the family of iguanas, as does also the pretty little red-throated anolis which lives in Cuba and in some of the Southern states.

Most of the other common lizards of North America belong to the group of the because of the agility of

Two close relatives of "chameleon" and the land, are of immense The story of the chameleon (see Chameleon), but deserves mention here creature is the sole surviving member of a group of reptiles otherwise extinct millions of years ago. The bodily structure of this "living fossil" has given science a key to the evolution of the whole reptile group, for it retains traces of many of the primitive bodily forms, notably a well-developed "third eye" buried beneath the skin of its forehead, which is a remnant of the third eye actually

NICKNAMES IN THE SKINK FAMILY



You'd think the Skinks were as fond of nicknames as boys are. For instance, Stump-Tailed, Broad-Toothed, Snake-Eyed, Three-Toed, and Five-Lined. This is the Five-Lined Skink—three lines on the back and one on each side.

"swifts," so named many of them.

the lizard tribe, the "tuatara" of New Zealand, are of immense interest to scientists. The story of the chameleon (see Chameleon), but deserves mention here creature is the sole surviving member of a group of reptiles otherwise extinct millions of years ago. The bodily structure of this "living fossil" has given science a key to the evolution of the whole reptile group, for it retains traces of many of the primitive bodily forms, notably a well-developed "third eye" buried beneath the skin of its forehead, which is a remnant of the third eye actually

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Lizards are "cold-blooded" creatures, like all reptiles. Some lay eggs similar to hen's eggs, varying from 1 to 20 at a time, but others produce living young. Their skin, like that of snakes, is normally covered with scales, and from time to time they shed the thin, horny, outside coating. Many of them possess, like the chameleon, the faculty of changing color rapidly. In temperate climates they pass the winter in a torpid condition in holes.

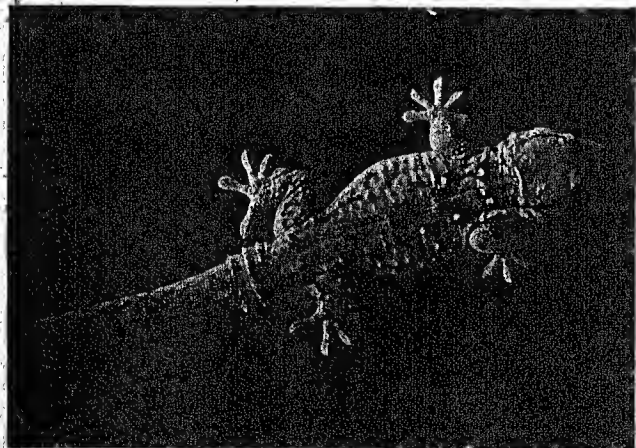
The family history of the lizards is particularly interesting because of its many relationships with the birds and mammals. You might think at first

THE "COMMON" LIZARD



The young of this species, which is common in Northern Europe, are born alive.

GUESS WHAT THOSE FUNNY "HANDS" ARE FOR!



This little Gecko can walk up and down or across a ceiling just like a fly. He has disks on the ends of his "fingers" and toes, which make this possible.

possessed and used by certain prehistoric reptile ancestors. The group which it represents is thought to have been the parent stock of all lizards.

that the lizards are dwarfed descendants of the prehistoric monsters that once roamed the earth (see Animals, Prehistoric). But this is not the case. Nature started with the original reptiles evolved from amphibians (see Reptiles) and from them developed the monsters. They proved unable to survive. However, nature had gone back to the primitive reptile stock, which was still in existence, and "tried again." The second effort produced small, fleet animals, capable of surviving under modern conditions. These "second effort" animals were the lizards.

At about the same time the lizards were appearing, nature was also producing (from much the same type of primitive reptiles, according to one theory) the first birds and the early mammals.

Lizards belong to the suborder *Lacertilia*. With the snakes, they form the order *Squamata* of the class *Reptilia*. They fall into four divisions: (1) common and primitive forms, such as geckos, Gila monsters, glass snakes, skinks; (2) burrowing forms, such as the amphisbaenas of Africa and South America; (3) large forms, such as iguanas and monitors; (4) the true chameleons.

LLAMA. Among the most grotesque of all the larger animals is the hissing spitting llama of South America. Although related to the camel of the Old World, the llama has no hump. Its wool is not valued as is that of the alpaca and vicuna, its near relatives, which like the llama live in the Andes of Bolivia, Peru, and Chile; for llama wool is coarse and rough and is suitable only for twine and very coarse cloths. The male llama is chiefly valued as a beast of burden and the females are useful for their milk and meat, which resembles mutton. The llama is a domesticated form of the wild guanaco which is still found in the Andes.

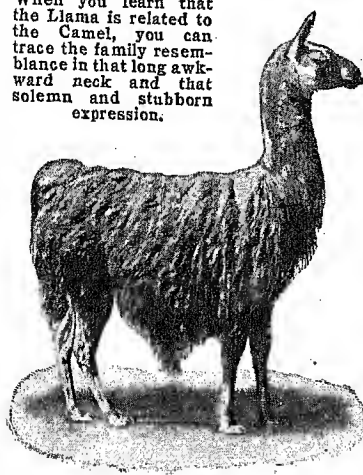
When the Spaniards conquered Peru in the 16th century, they found the Incas of that land using hundreds of thousands of llamas as riding animals and beasts of burden. In the whole New World these were the only domesticated animals except dogs, and the lack of such helpers to man as

the horse, ass, ox, sheep, and pig, was one of the chief reasons why the New World lagged behind the Old in civilization. The Spanish conquerors continued to use the llamas, and long strings of these animals in charge of a few native drivers were soon passing back and forth carrying silver by the narrow mountain trails from the mines to the coast. Until the middle of the 19th century these remained almost the only means of transportation in the Andes Mountains.

The llama is about three feet high at the shoulders and is capable of carrying 120 pounds at the leisurely rate of 12 miles a day. If treated well, they are willing and docile. They gather their own food, are hardy, and can travel over places too rough and steep for any other burden-bearing animal.

If overloaded, they will lie down and refuse to move. When disturbed, they spit a ball of food and saliva at their tormentor. Scientific name, *Lama glama*.

When you learn that the Llama is related to the Camel, you can trace the family resemblance in that long awkward neck and that solemn and stubborn expression.



The "LITTLE WELSHMAN," Britain's Great War Minister

His Education by His Uncle, the Village Cobbler Whose Name He is Proud to Bear—How, as One of England's Greatest Statesmen, He Fulfilled the Ambitious Dream Recorded in a Boy's Diary

LLOYD GEORGE, DAVID (born 1863). At the age of 17 this Welshman, who divides the honor with the younger Pitt of being Britain's greatest war premier, visited the House of Commons for the first time. He wrote in his diary, "I will not say that I eyed the House of Commons in the spirit in which William the Conqueror eyed England on his visit to Edward the Confessor," but already he was dreaming of future political greatness.

His own hard youth had made him a radical in politics. Left in poverty at the age of three by the death of his schoolmaster father, William George, he was reared and educated by his mother's brother—Richard Lloyd, a village cobbler of North Wales—in whose honor he bears the name "Lloyd" along with that of his father. He studied law and at the age of 21 was admitted to practice as a "solicitor." Almost at once he made his mark by winning cases for tenant farmers against their landlords, as well as by his earnestness in defending the rights of Welsh "Non-conformists" against the claims of the Church of England. And soon he was elected to Parliament as a Liberal from the Welsh constituency of Carnarvon, a seat which he was to hold for over 30 years.

In Parliament he dared to cross swords even with his leader, the great Gladstone. He was afraid of no one; he was quick and biting in reply, and he speedily

won attention. When the South African War came on, he showed his courage by taking the unpopular side and going up and down the country making speeches against the war, on the grounds that it was due to imperialistic designs against the Boer republic. He was mobbed in Birmingham and only escaped from the building in the disguise of a policeman.

When the Liberals came into power at the end of 1905, Sir Henry Campbell-Bannerman, the new prime minister, offered Lloyd George one of the minor places in the Cabinet as head of the Board of Trade. In this office he put through a shipping act that helped sailors, and in settling a great railway strike he revealed a capacity for conciliation which no one had suspected, but which was to prove a characteristic of all his statesmanship.

When Asquith in 1908 succeeded Campbell-Bannerman as prime minister, he asked Lloyd George to take the second place in the Cabinet, that of chancellor of the exchequer. The friend of the poor now had his chance. It was his first duty to bring in the budget, that is, the annual estimate of expenditures and proposed taxes to meet government expenses. To provide funds for the Old Age Pension Act, which he helped to pass, Lloyd George proposed many new taxes which took the burdens of taxation from the shoulders of the poor and put them on those of

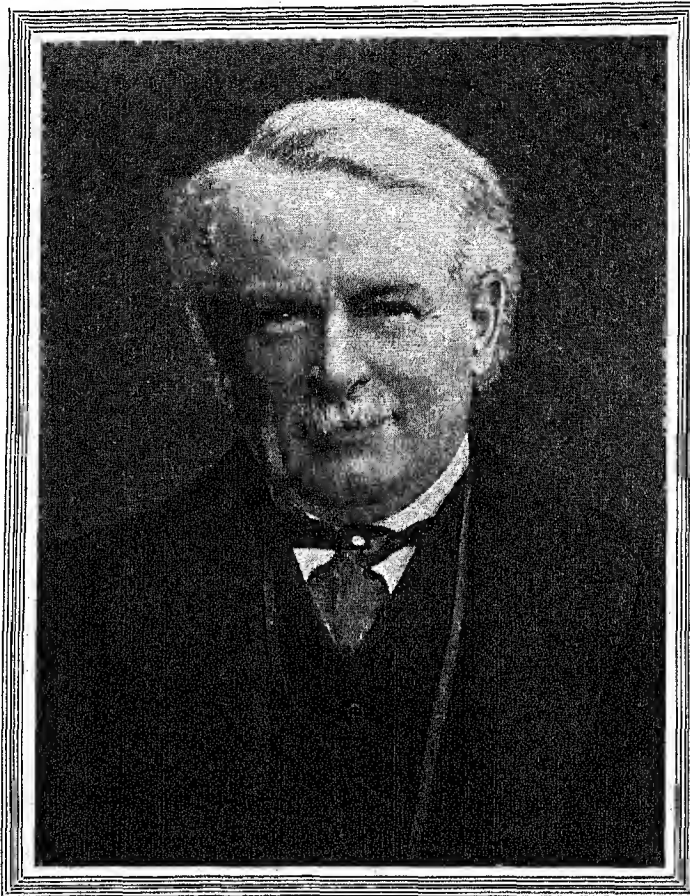
the rich. "I made up my mind that in framing the budget which was in front of me," he said, "no cupboard should be barer, no lot harder to bear." This budget was much more than a financial proposal for the year; it was a program of social change, for it would break up the great landed estates by taxing the "unearned increment" in land values (see Taxation). His enemies called it a revolution.

The budget made Lloyd George the idol of the poor, but it also made him the most hated man in England by those whose lands and pocketbooks were affected. The House of Lords rejected it, and then the Prime Minister gave notice that the government proposed to limit the power of the Lords to reject legislation passed by the Commons. A great struggle followed and two elections were held within a year. Lloyd George took a leading, if not the chief, part in this struggle, which produced a change in the British constitution as profound as that created by the Reform Act of 1832. But the Lords were at length with great difficulty defeated. The Parliament Act of 1911 destroyed the power of the Lords to reject a money bill (such as the budget), but it still left them the possibility of holding up ordinary legislation for two years.

Immediately Lloyd George produced a new program of social legislation. The chief measure passed gave working men cheap insurance against sickness and unemployment, with free medical service, payment of partial wages during periods of disablement, hospitals for tuberculosis, maternity benefits for their wives, etc. This legislation entitles Lloyd George to rank as one of the greatest practical social reformers in history and caused him to be regarded for many years as the champion of the working classes of England.

From the time of the Boer War Lloyd George had been regarded as a pacifist. He was a "little Englander," and was reluctant to see money spent on armaments and imperialistic expansion which might be spent in alleviating misery; for he looked forward to a time "when poverty with its wretchedness and squalor will be as remote from the people as the wolves which once infested the forests."

When the World War broke out in 1914, many people expected that Lloyd George would resign. But after Belgium was invaded he came out in unmeasured terms against Germany's aggression. As chancellor of the exchequer it was his first task to provide the money—"silver bullets"—without which Britain could not hope to win. He gained the confidence of the banking and landed interests, hitherto his bitterest enemies. He was one of the first to realize that Britain was hopelessly outdistanced by Germany in the



DAVID LLOYD GEORGE

quantity of shells manufactured, and was given the new post of minister of munitions. By his enthusiasm and dynamic energy he organized the munitions manufacture in every corner of the kingdom, and soon the British army was as well equipped as Germany with shells for the battlefield.

But Lloyd George became more and more restive under Asquith's government. He felt that his old chief was not pushing the war hard enough. He became certain that Britain must have a more forceful war leader, and he was strongly supported by Lord Northcliffe, proprietor of the London *Times* and other papers, in demanding a change of government. In December 1916, he overturned his chief and himself became prime minister. In his new capacity he gathered around him trained executives and gave drive to the war. He stood out relentlessly

against the talk of a "peace by compromise," rallied the faint-hearted, pressed the supplies of munitions, and made over the army staff.

The outcome of the war abundantly justified his course. During most of the war a coalition based on a union of the Liberal and Conservative parties had carried on the government, with the Conservatives becoming more and more prominent. In the "khaki election" of November 1918, Lloyd George obtained a House of Commons containing a large majority of his supporters; but it was made up largely of great manufacturers and business interests, of "profiteers," its enemies said.

At the Peace Conference Lloyd George steered no consistent course. Now he was with France in her efforts to destroy Germany once and for all; now he was with President Wilson in his efforts for a peace based upon reconciliation and the rights of nationalities. Here, as earlier in his career, he showed his genius for conciliating and bringing to a compromise agreement persons of widely opposing views. Britain gained materially by the Conference, even though unable to get those great indemnities from Germany which Lloyd George had recklessly promised the electors.

After the war Lloyd George plunged into the task of finding work for 2,000,000 unemployed and of maintaining peace in discontented portions of the empire. But the popularity of the dynamic war leader quickly declined, and in 1922 he was forced to resign. Thereafter, Lloyd George played only a minor rôle in politics, although he continued to enliven Parliament with his brilliant speeches. In 1935 he proposed a "New Deal" of peace and reconstruction, which the government rejected. He published eight volumes of 'War Memoirs', the final volumes of which, concerning the peace conference, appeared in 1939.

LOBSTER. What a curious creature the lobster is, with his powerful claws and long antennae, his eyes mounted on the ends of movable eye-stalks, and his armor-like shell of bottle green covering body and tail! Green? Yes, for it is only when the lobster is

boiled or otherwise cooked that he turns the brilliant red which formerly caused the red-coated British soldiers to be called "lobster backs."

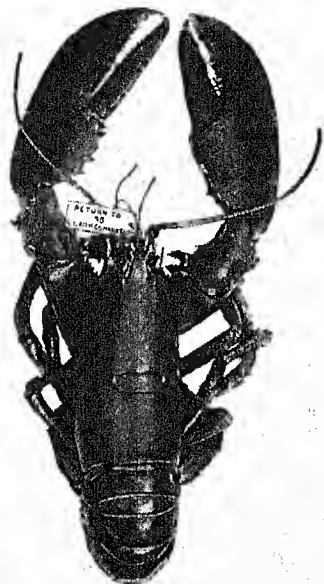
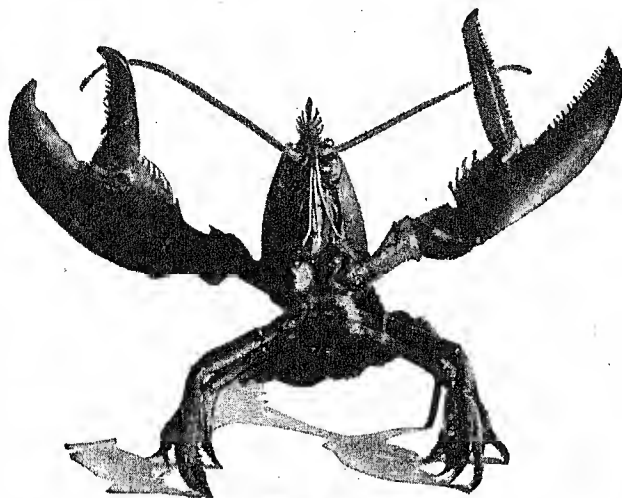
The lobster belongs to the crustacean family and is a big brother to the crawfish and shrimp. Lobsters are found in many parts of the world, and there are several different species, varying only slightly from the American lobster, which is found on the Atlantic coast from Delaware to Labrador,

and is most abundant on the shores of Maine and Nova Scotia. Its tail is made up of six jointed segments; it breathes by means of many pairs of feather-like gills inclosed on each side of the body under the shell of the head and thorax; and its large powerful claws are used, the blunt-toothed one for crushing and the sharp-toothed one for cutting its food. Behind the large claws are four pairs of walking legs, the first two pairs of which end in small claws. Each joint of the abdomen has a pair of swimmerets. The last joint has expanded plates which assist the animal when it swims backward.

The lobster lives sometimes in shallow water near the shore and sometimes in deep water, but it prefers a rocky bottom and reaches its greatest size in such conditions. Lobsters eat animals living and dead, and vegetable matter to a less extent. They sometimes even eat each other. They are well protected by their hard shells and

powerful claws and their habit of burrowing down among the rocks, but when they are small, or when they are molting, as they do once a year, great numbers are destroyed by fishes.

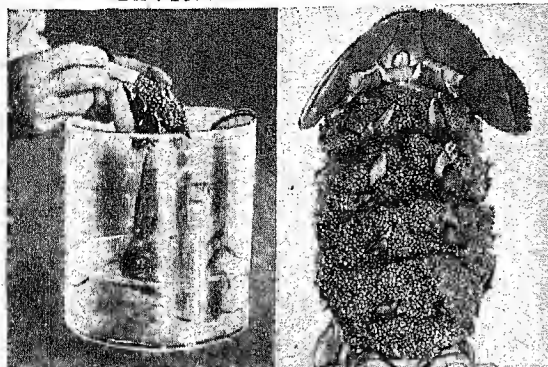
THE LOBSTER SHOWING HIS "TEETH"



The Lobster does a good deal of chewing with his claws. You can see the difference between his two claws in the top picture. The heavy, blunt-toothed claw is for crushing, and the sharp one is for cutting his food. Notice how the lobster below is labeled with a copper ticket. He is turned loose with this ticket on, which asks any fisherman who may capture him to report it to the United States Bureau of Fisheries. This is one way the experts study the movements and habits of lobsters.

The female lobster produces a great many eggs, from 3,000 to 100,000 according to her size and age. These eggs are attached to the swimmerets on the

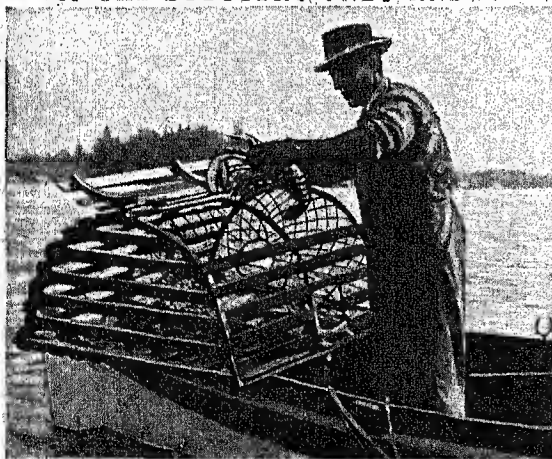
SAVING LOBSTER EGGS



The reason the female Lobster carries so many eggs is that in a state of nature comparatively few have a chance to hatch and grow into adult lobsters. But at the lobster hatcheries these eggs are collected and protected so that about half of them hatch into healthy young lobsters, able to protect themselves. This is one way of preventing lobster extermination.

under side of her tail by a sort of glue, and the female is thus called a "berry lobster." After 11 months the eggs hatch into small larval forms, and for six to eight weeks these remain as free-swimming larvae, molting five or six times with various changes of color. The adult form is attained when the lobster is about three-quarters of an inch long, and at this stage it sinks to the bottom near the shore and begins its lobster life. As a general rule a lobster 10 to 12 inches long is about five years old. Great age and size are sometimes attained, individuals weighing

IF THE LOBSTERS ONLY KNEW!



You see the mouth of this lobster trap is like a funnel so that the lobsters can easily swim right in through the hole. But when they try to get out, they only bump around the sides without realizing that, if they would only aim for the point of the funnel they could easily get out.

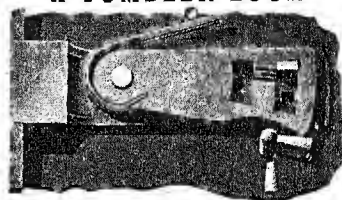
more than 30 pounds having been found; but one weighing 25 pounds is uncommon.

The American lobster early became a favorite article of food, and lobster fisheries have existed on the

Massachusetts coasts for more than a century. The method of capture is simple. A slatted box or barrel, with a funnel-shaped opening of coarse netting in the ends is baited with fish, weighted with a flat stone, and sunk to the bottom on a quarter-inch line. The lobster fisher has his "lobster pots" set at intervals and visits them once a day to remove the lobsters and replenish the bait. Besides being sent fresh to many parts of the country, large quantities of the lobster meat are canned, especially at Portland, Me. The British and United States governments maintain extensive lobster hatcheries, to keep lobsters from being exterminated by the fisheries.

LOCKS AND KEYS. Keys a foot long and weighing as much as a pound were common in the Middle Ages, and the warden of a dungeon or a castle carried at his belt a jangling weight, which in emergencies could become a terrifying weapon. Yet the great locks

A TUMBLER LOCK



The spring tumblers hang on a pivot and fit over that small oblong projection from the bolt in the upper right-hand corner. When the proper key is turned, the tumblers are each raised just the amount necessary to release that bolt projection. Then, as the key is further revolved, it catches in the V-shaped cut in the bolt, which is just visible behind the tumblers and pushes out the bolt. When the bolt projection reaches the second oblong notch at the left, the tumblers fall into place again, and the bolt is locked.

which were opened by those giant keys were not as secure as the delicate modern locks fitted with keys that tuck away snugly in a vest pocket.

The locks of today may be divided into two general classes—warded locks, and tumbler or lever locks. The warded lock has

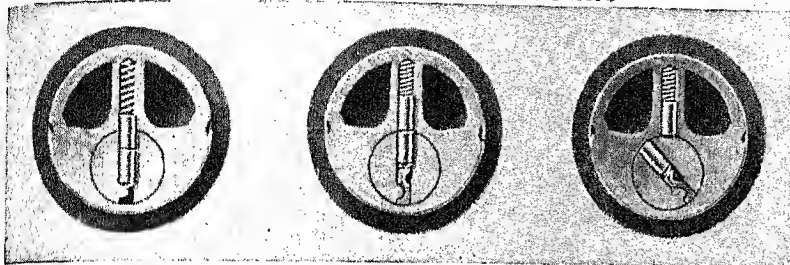
on the inside a number of projections or ridges called "wards," which prevent the turning of the key unless the grooves or cuts of the key coincide with the wards. This is the type of lock used in ordinary drawers, wardrobes, desks, etc. The tumbler lock—an improvement on the warded lock—was probably invented by the Chinese, and its fundamental principle was employed in an ancient Egyptian lock. Instead of wards, this lock has small movable levers or pegs called "tumblers." This lock can be opened only by a key whose indentations or "bittings" will raise each tumbler exactly to the proper height.

It was not until the latter part of the 18th century that these locks were substantially improved upon. It was then that the English Bramah lock came into use. This consisted of a number of sliding tumblers contained in a tube or cylinder projecting from the lock—a construction by which it was made more secure and harder to pick than other locks.

The Bramah lock, in turn, was improved by the American inventor Linus Yale, Jr. (1821-1868), who perfected his "pin-tumbler" or "cylinder" lock universally known today as the Yale lock. It is a cylinder within a cylinder. It opens with a

flat key, and cannot be opened by any key differing from the true key by even so little as one-fiftieth of an inch in the height of any notch.

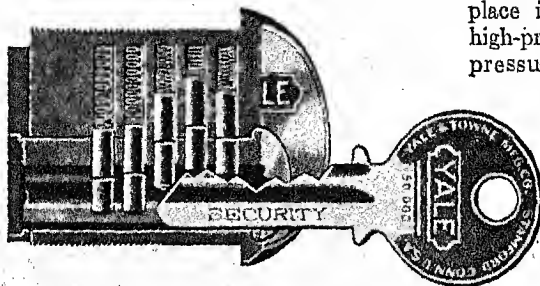
HOW A CYLINDER LOCK WORKS



In the first picture we see a cross-section inside the lock, showing how the smaller cylinder, fitting within the larger cylinder, is kept from revolving by a "pin-tumbler," which is thrust down by a tiny coiled spring. This pin-tumbler is cut in two near the middle. In the next picture we see what happens when the key is inserted — the pin-tumbler is raised until the "cut" comes at the junction point of the two cylinders. This permits the inner cylinder to revolve, as shown in the third picture.

But even the best of key locks can be opened either with a skeleton key—a key with most of its blades cut away to avoid all the wards—or with some other device of the burglar or the expert lock-picker; and it remained for Yale to invent the keyless dial or combination lock so widely used today for safes and vaults. This lock is operated by a knob or handle which is turned back and forth certain "combinations" of distances known only to the proper persons. The rotation of the knob, of course, merely sets the wheels or tumblers in the mechanism of the lock so that it will slip open.

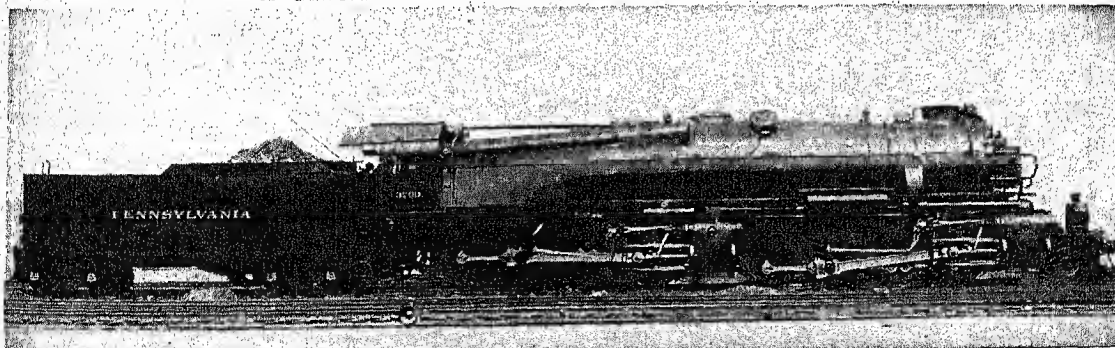
Finally, improvements on the combination lock



Here we see the cylinder lock from the side, and cut away to show the mechanism. This is a "five-tumbler" lock, each tumbler working like the one described in the first pictures. As the key goes in, the tumblers are pushed up by the wedge-shaped point. When the key is all the way in, if it is the proper key, the five tumblers will all rest in its notches in such a way that the tumbler cuts are all directly in line with the cylinder division, and the inner cylinder can turn and pull back the bolt.

head and crank. The engine must be reversible. This can be done by shifting the valve gear which admits steam to the cylinders. The valve gear also can

A GIANT LOCOMOTIVE WITH IMMENSE POWER



This is an example of the tremendous size reached in building modern locomotives. It has four cylinders, two on each side, and sixteen driving wheels, eight on each side. Such engines are used to haul great freight trains, as you might guess by the comparatively small size of the wheels, which are designed to give power rather than speed. Fast passenger engines are much lighter and have huge "drivers."

brought forth, in 1857, the greatest lock of all—the time locks, in which a timepiece is set with the lock, and the clockwork operates the mechanism. Thus the lock can only be opened at a certain time.

be set to cut off the steam after the piston has made part of a stroke; expansion of the steam already admitted then finishes the stroke. This saves steam and fuel; indeed, no locomotive could make steam

enough to run at full stroke continuously. The exhaust steam is turned up the smokestack to create a draft through the fire, and causes four puffs for each turn of the wheels, two from each side. The sides alternate in causing puffs, because the driving rods on one side are attached to the wheels a quarter-turn around from those on the other side. Thus the locomotive never is "on dead center," with all driving rods horizontal and therefore unable to turn the wheels.

Exhaust steam also may be used to preheat water before it is introduced into the boiler, and thus cut down the amount of fuel needed to make steam.

Development of the Locomotive

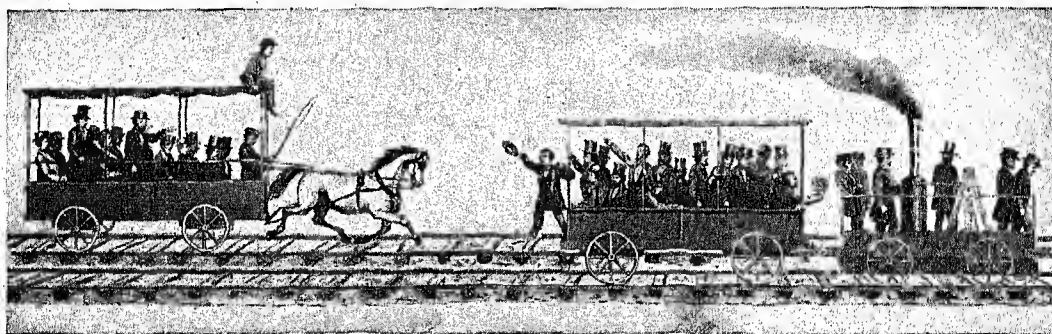
Like all great inventions, the locomotive grew through the slow accumulation of improvements made by different inventors. Men in England worked on the idea as early as the 18th century. Most of their devices were designed to run on ordinary highways, and so were forerunners of the automobile (see Automobile). In 1804 Richard Trevithick ran one of his road engines on rails at Pen-y-darran, Wales, at the rate of five miles an hour. William Hedley improved on this in 1813 with his "Puffing Billy," so called

because it used exhaust steam in the smokestack, as modern locomotives do. This was the first engine to use smooth wheels on smooth track.

George Stephenson built a workable locomotive for the Killingworth colliery in 1815. In 1825 his locomotives ran at the rate of 16 miles an hour on the newly opened Stockton and Darlington Railway. In 1829 George Stephenson's son Robert devised a multi-tubular boiler for the locomotive "Rocket." This boiler gave power enough to maintain speeds of 25 to 30 miles an hour, and the "Rocket" won a speed, pulling, and endurance contest held by the Liverpool and Manchester Railway. This event is considered the birth of the modern railroad.

Today locomotives weigh as much as 600 tons, can pull more than a mile of freight cars, or haul passenger trains at more than 100 miles an hour. Locomotives use oil fuel wherever it is cheap, as in the American Southwest; and a rival to steam power has arisen in the Diesel-electric locomotive, both in fast passenger service and in heavy freight duty, particularly terminal switching. It is markedly economical in fuel cost (see Railroads).

RACE BETWEEN HORSE-CAR AND LOCOMOTIVE IN 1830



The first locomotive engine built in the United States was the "Tom Thumb," constructed in 1829 on an original principle by Peter Cooper, of New York. It was not much larger than the hand-cars that workmen use on the tracks today, and its upright boiler was no bigger than the kitchen boiler attached to an ordinary coal range. But it did the work, as is shown by the following account of a trip made on Aug. 28, 1830, on the newly laid tracks of the Baltimore and Ohio railroad between Baltimore and Ellicott's Mills, and back:

"Mr. Cooper's success was such," writes one of the passengers, in speaking of the earlier tests, "as to induce him to try a trip to Ellicott's Mills, on which occasion an open car, the first used upon the road already mentioned, having been attached to the engine, and filled with the directors and some friends, the speaker among the rest, the first journey by steam in America on an American locomotive was commenced."

"The trip was most interesting. The curves were passed without difficulty, at a speed of 15 miles an hour. The grades were ascended with comparative ease. The day was fine, the company in the highest spirits, and some excited gentlemen of the party pulled out memorandum books, and when at the highest speed, which was 18 miles an hour, wrote their names and some connected sentences, to prove that even at that great velocity it was possible to do so. The return trip from the Mills, a distance of 13 miles, was made in 57 minutes."

"This was in the summer of 1830, but the triumph of this Tom Thumb engine was not altogether without a drawback. The great stage proprietors of the day were Stockton and Stokes, and on that occasion a gallant gray, of great beauty and power, was driven by them from town, attached

to another car on the second track—for the company had begun by making two tracks to the Mills—and met the engine at the Relay House, on its way back. From this point it was determined to have a race home; and, the start being even away went horse and engine, the snort of the one and the puff of the other keeping time and time.

"At first the gray had the best of it, for his steam would be applied to the greatest advantage on the instant, while the engine had to wait until the rotation of the wheels set the blower to work. The horse was perhaps a quarter of a mile ahead, when the safety-valve of the engine lifted, and the thin blue vapor issuing from it showed an excess of steam. The blower whistled, the steam blew off in vapory clouds, the pace increased, the passengers shouted, the engine gained on the horse, soon it lapped him. The lash was piled—the race was neck and neck, nose and nose. Then the engine passed the horse, and a great hurrah hailed the victory. But it was not repeated; for just at this time, when the gray master was about giving up, the band which drove the pulley which moved the blower, slipped from the drum. The safety-valve ceased to scream, and the engine, for want of breath, began to wheeze and pant."

"In vain Mr. Cooper, who was his own engineer and fireman, lacerated his hands in attempting to replace the band upon the wheel. In vain he tried to urge the fire with light wood. The horse gained on the machine and passed it. Although the band was presently replaced, and steam again did its best, the horse was too far ahead to be overtaken, and came in the winner of the race. But the real victory was with Mr. Cooper, notwithstanding. He had held fast to the faith that was in him, and had demonstrated its truth beyond peradventure!"

LOCUST. The "17-year locust" is a *cicada* (see *Cicada*), but the name locust is also applied to the short-horned grasshoppers. Those are the "locusts" mentioned in the Bible, and which still appear at times in vast numbers in oriental countries, and sometimes in the Western states. A column of flying locusts has been seen in India estimated to be several hundred miles long and dense enough in some places to obscure the light of the sun. (See *Grasshopper*.)

LOCUST TREE. In Maytime the locust tree flaunts its plumelike clusters of creamy white or reddish flowers, scenting the air with their honey-sweet perfume, while the

graceful sprays of its pale green leaves form a beautiful setting for the delicate blossoms. In September pods appear on the flower stalks. Varying from a spreading shrub to a slender tree of 70 to 80 feet in height, the locust holds a place among the most beautiful park and forest trees of eastern North America. There are a number of different species. The black or yellow locust, found from Pennsylvania southward to Georgia and westward, has white blossoms. The clammy locust, which is so called from its sticky clammy buds and

branchlets, thrives farther south and bears very showy pink flowers. The rose or moss locust is rather shrubby in habit of growth, and its blossoms are especially large and deep rose in color.

Because it is tough and durable, locust wood is used in shipbuilding, and for fence posts, wheel spokes, and railroad ties.

Although they all belong to the pea family, several trees with the name locust are not true locusts. The honey locust, common from New York southward and westward, belongs to the genus *Gleditsia*. A mass of feathery leaves and unusually long, flat pods distinguish the tree. The greenish-white flowers are less conspicuous than those of the true locusts. The carob, or St. John's bread, which flourishes along the Mediterranean, has pods which are used as food for

stock and sometimes as human food. These pods are dried and exported, and may occasionally be purchased at our fruit stands.

Scientific name of the black or yellow locust, *Robinia pseudacacia*. Bark reddish-brown, rough and broken in ridges. Leaves compound, alternate, with leaf-stalks hollowed at base and covering buds of the succeeding year, odd-pinnate with from 11 to 25 leaflets. Flowers white, fragrant, growing in loose axillary racemes. Pods linear, glabrous, containing from 4 to 6 brown seeds, remain on trees over winter.

LOG, SHIP'S. Speed of a vessel is reckoned by a device called a ship's log. The older type of log consists of a long line

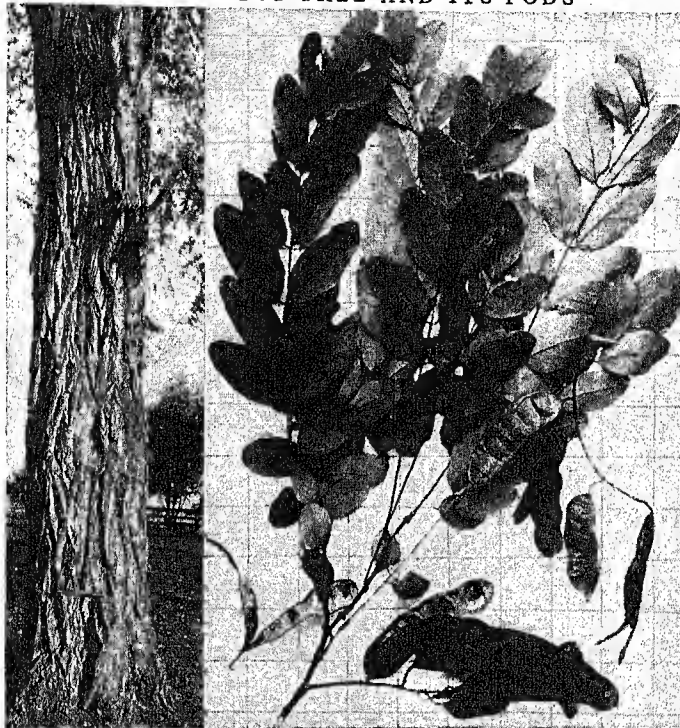
marked into equal sections with knots of colored cloth. To the free end is fastened the log-chip, a small flat board shaped like the sector of a circle and loaded with lead along the rounded edge. When this is hurled far out over the stern, the lead balances it so it floats point upward and remains practically stationary. As the ship plows on the logline is allowed to unwind itself freely from its reel. At the end of a fixed time the log-chip is hauled in again. The number of knots on that part of the logline which has passed overboard is counted and in this way the

speed at which the ship is running is figured out.

Commonly the knots are 47.33 feet apart, and the log is allowed to run for 28 seconds. With this arrangement the number of knots unwound indicates the number of nautical miles per hour the ship is traveling. This explains why the speed per hour of a ship is always spoken of as so many "knots." It is incorrect to say "knots per hour."

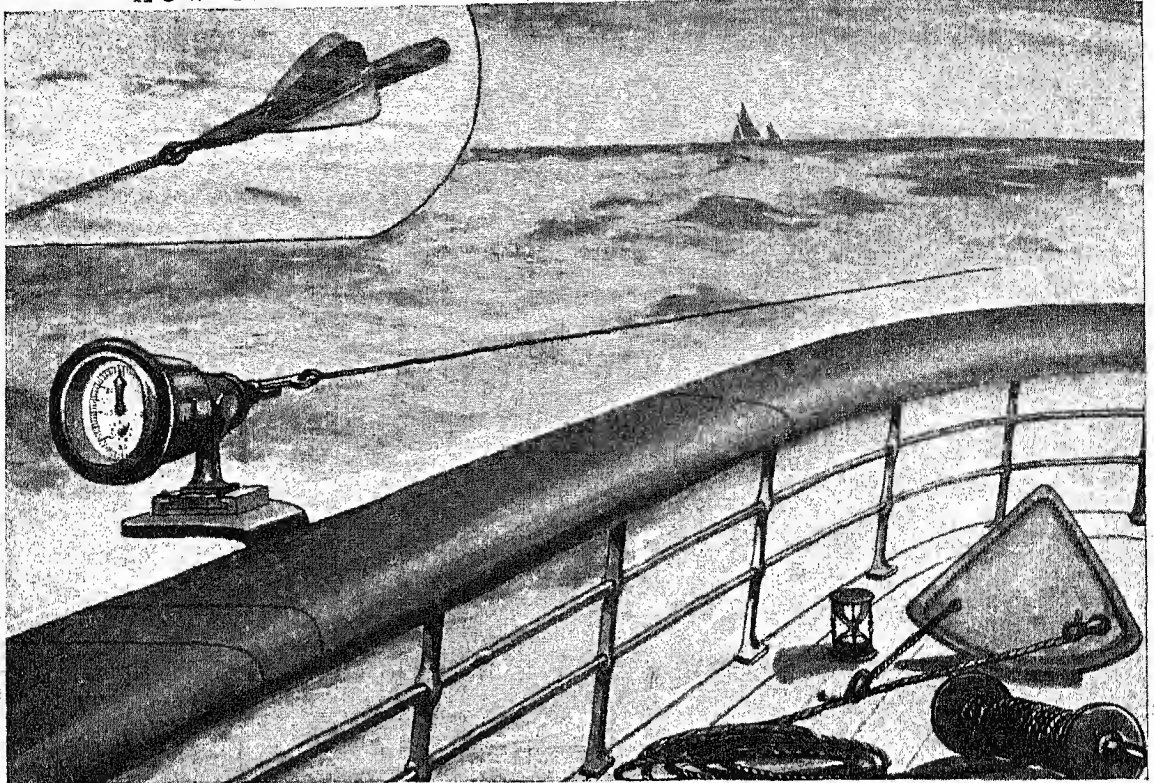
Most modern steamers use the patent or "taffrail" log. In this, a "fly" or rotator in the form of a propeller takes the place of the log-chip. As the fly is towed through the water it rotates, thus twisting the line and operating a system of gears which indicates the ship's speed on a register or dial on deck in somewhat the same way that a speedometer tells the speed of an automobile.

THE LOCUST TREE AND ITS PODS



This is a fine Locust tree some three feet in diameter, as you can see by the foot rule attached to the front of it. On the right is a branch with the beautiful leaves and the seed pods. The pods have a sweet pulp in them that boys, as well as wild animals, are often very fond of.

HOW THE SPEED OF SHIPS AT SEA IS MEASURED



Lying on the deck is the old style Ship's Log, consisting of a measured line attached to a wooden "drag" called a "log chip." The latter is weighted at the bottom so it will remain point up in the water and so offer enough resistance to drag the line steadily overboard. A sand-glass, usually one which will run out in 28 seconds, is used for timing. The log chip is rigged so that, when the log is run, a sudden jerk on the line will detach one side of the "harness" and permit the chip to be pulled back edgewise through the water. The "patent" or "taffrail" log is shown attached to the rail, its metal cable running out over the stern. At the end of that cable is a small propeller-shaped rotator like the one in the upper left-hand corner. The drag through the water sets this whirling, and this in turn whirls the cable, and so operates the gears inside the nautical "speedometer." The large hand on the face of the instrument indicates the speed of the ship.

The term "ship's log" or "log book" is also applied to the journals kept by ship commanders to record the course and speed of the vessel, and all other important details of voyages. Such records are required by law, and so important is the "log" as a legal record in case of deaths at sea, crimes, shipwrecks, collisions, suits over damaged or lost cargo, and marine insurance cases, that a ship captain will save his log book at any cost if his vessel goes down.

Written in dry and official language, these records often conceal in a brief sentence a whole stirring story of romance or tragedy of the high seas. "Seaman John Smith, overboard, rough seas, couldn't lower boats; Seaman Jones swims to rescue with life-line"—such an entry may conceal a piece of unrivaled heroism. The details of the sinking of the *Lusitania* by a German submarine—a deed which stirred the whole world and had a profound effect on the course of the World War—were recorded in a few brief sentences in the submarine's log. Yet upon that brief record rested the final conclusive proof of the guilt of Germany's sea-lords for that frightful tragedy.

LOGANBERRY. Next to the strawberry, the loganberry is probably our finest table berry, yet it is a

comparatively recent product. It appeared in 1881 at Santa Cruz, Calif., in the garden of J. H. Logan, and is believed to be a hybrid between a wild blackberry of the Pacific Coast and a red raspberry. Loganberries are now extensively cultivated from southern California to British Columbia. If protected in winter the plant can be grown in many parts of the Central, Middle, and New England states. The fruit is purplish red and very large. Its flavor is between that of its parents. It is used as a dessert fruit, is extensively canned and dried, and the juice has become a popular beverage.

LOGWOOD. The reddish dye made from logwood was once so valuable it led to a war. Captain Robert Jenkins, a loyal subject of King George II, was caught, so the story goes, smuggling logwood from the forests of Central America. The Spaniards who owned the forests cut off one of his ears. When Parliament heard about it seven years later (1739), indignation ran so high war was declared on Spain—the "War of Jenkins' Ear."

Logwood grows to be a tree from 30 to 50 feet in height, and it gets its name from the fact that it is shipped in the form of logs. The tree, which is found in the West Indies, Mexico, and Central America, is

ready for felling when about 10 years old. It is then stripped of the bark and sapwood, which are worthless, and cut into three- or four-foot lengths.

On exposure to the air the heartwood, which is very hard and heavier than water, takes on a beautiful brownish-red color. This is due to a crystalline substance called hematoxylin, which is extracted from the wood and is used in making dyes—purple, blue, gray, and black. It is used chiefly in dyeing cotton, silk, wool, and leather, and also in ink, in stains in microscopical preparations, and in medicine.

The finest kind and the greatest quantity of logwood comes from Campeachy (Campeche) in Mexico, and so it is often called Campeachy wood. Scientific name of the tree, *Haematoxylon campechianum*.

LOHENGRIN (*lō'ên-grîn*). This "Knight of the Swan" is the hero of a beautiful medieval German legend. According to the story, when Elsa, a fair young duchess of Brabant, was in distress and waited despairingly for someone to come to her aid, there appeared a knight in a boat drawn by a silver swan. This was Lohengrin, the son of Parsifal (Perceval), whom King Arthur had sent from the castle of the Holy Grail to fight as her champion. Having won her cause, Lohengrin married Elsa, but he made her promise that she would never ask his name or whence he had come. They lived happily until Elsa, yielding to her doubts, asked the fatal question; whereupon Lohengrin was forced to bid her farewell. The swan-boat reappeared on the river and bore him away, never to return. Wagner has made this legend the subject of one of his beautiful operas.

LOIRE (*lôir*) **RIVER**. The longest river in France, the Loire is also the most interesting, for it rises in the southeastern part of the country, only 85 miles north of the Mediterranean, flows northward for over half its course through a strange and beautiful region, then sweeps with a great curve toward the southwest, where it passes through a famous country of old Roman ruins and historic medieval castles, discharging its waters at last into the northern part of the Bay of Biscay. Its whole course covers about 645 miles.

Rising in a spur of the Cevennes Mountains, 4,500 feet above sea-level, its headwaters are fed by melting snows from bristling mountain peaks, as it dashes through narrow gorges in a roaring torrent, carrying with it the debris of old volcanic eruptions. From this stormy region it emerges upon gentle green prairies where white oxen graze. Somewhat farther on, where the country is again mountainous, the river flows through a beautiful valley overgrown with vineyards and orchards, with here and there a strip of forest or a village with quaint old houses of stone or brick. At the northernmost point reached by the river, 75 miles southwest of Paris, is Orleans, an old city of many historic memories, delivered from the English in the 15th century by Joan of Arc. Below Orleans the Loire enters the old province of Touraine, a country of old Roman ruins and frowning feudal towers, whose halls once echoed to the mailed tread of French

chivalry. About 75 miles southwest of Orleans rise the towers of Tours, the capital of the province; while 35 miles from the river's mouth is the city of Nantes, where Henry IV signed the famous edict giving religious liberty to the Protestant Huguenots (1598). At this point the Loire widens into an estuary with many islands, over portions of which Nantes, now an important manufacturing city, has spread. The port of St. Nazaire, accessible to the largest ocean-going vessels, lies at the point where the river mingles its waters with those of the Bay of Biscay; in the World War it was one of the chief ports of disembarkation for the American troops.

The Loire is navigable only in a very limited sense. In many places it is choked with rocks and gravel carried down from the mountains, or with sand and clay from the Paris Basin, rendering its channel uncertain. In the wet season its many tributaries so increase the volume that it floods wide stretches of land along its banks, while in the heat of summer it shrinks to a thread of sandbars and shallows. Many canals, however, have been built as an aid to navigation, notably those connecting it with the Seine, the Saone, and (at Nantes) with the harbor of Brest.

LOMBARDS. The most productive region of Italy, the great fertile valley of the Po, is still called by the name Lombardy, from the barbarian Lombard hordes who overran it in the 6th century. These people, the last of the Germanic invaders of Italy, pressed down from the north (568 A.D.) within 15 years of the time when the emperor Justinian had expelled the East Goths (*see* Goths). They soon gained the mastery of most of the peninsula, though Rome, Ravenna, and a few other fortified cities successfully resisted their assaults. They failed to establish a strong central government, however. Many small dukedoms grew up, thus dividing Italy into numerous small divisions whose jealousies and rivalries helped to lay the foundations for the disunion which lasted until the unification of Italy in 1870. The Lombard kingdom in the valley of the Po lasted a little more than two centuries; it was finally overthrown by Charlemagne (773), who invaded Italy at the request of the Pope, dethroned the king, and was himself crowned with the "iron crown" of Lombardy—so called because beneath the gold was a circlet of iron, said to be made from one of the nails with which Christ was crucified. After the break-up of Charlemagne's empire the Lombards gradually merged with the other peoples of Italy.

The energetic race which grew up from this fusion of Latin and Teuton became conspicuous from the 13th to the 16th centuries for the success of its members as merchants and money lenders. They found their way to London and other European cities in such numbers that north of the Alps all Italians came to be known as "Lombards," and finally the name "Lombard" became synonymous with "money lender." The street in London which corresponds to the "Wall Street" of the United States is still called from their name "Lombard Street."

GIANT LONDON — *The* HEART of the BRITISH EMPIRE



St. Paul's Cathedral, from the Southwest

LONDON, ENGLAND. The first impression of a traveled American on reaching London may be one of disappointment. The Thames with its muddy current is not a large river, according to American standards, and much of the city itself is dingy and gray, moss-grown and old. Buildings famous in history and drama—Whitehall, The Temple, the Bank of England—seem small and plain compared to the giant skyscrapers of New York and other cities of the United States. There is so little visible that is sumptuous, regal—so little blare and glare and flare. London isn't a show-counter city. At first glance it is something like a slightly dowdy old lady—you could never mistake her for anything but a lady—who keeps her best gowns and laces in lavender and her best jewels in a family bank vault, only to be donned and exposed to view on rare occasions.

Then something begins stealing in upon you, like the beauty and majesty of the mountains, which speak in a language you cannot hear. Perhaps it is the sense of venerable uncounted years, like the lawns of the many parks which have taken a thousand years to grow their velvet swards; or the sense of vast multitudes of human beings—now, yesterday, the day before yesterday—back—back—back—before history, where history fades—of which this great city is the monument and the heir. Or perhaps it is the muffled roar of traffic like a stormy sea. The traffic of American cities doesn't roar; it screams and honks and rattles in staccato bursts of sound, and silence stabbed by new sounds. But London traffic is a roar, a muffled roar of countless wheels and feet and

voices, all kinds and qualities of notes drowned in one symphony of beat-beat-beating sound like a storm at sea. It is like the muffled roar of a vast water-fall of human beings and races down all the ages of the world, over the precipice of today into tomorrow. You come shooting by rail up from Southampton to London, or eastward from Liverpool with the parks and fields and villages blurring into one another on each side of you; or else you are towed up the estuary of the Thames, with green-gray banks and myriads of vessels of every flag under the sun to right and left of you. And the thunder of the city's traffic comes to meet you in a muffled beat.

London is English history made visible in stone and brick. One's sense of this is stronger today than ever, now that German bombs have blasted many of its most beautiful and ancient buildings into heaps of rubble. London today is one vast memorial, scarred from end to end with the thunderbolts of war. But in this rapid survey we are about to make, let us go back in imagination to happier days and visit the London of the 1930's.

We Start from the Tower of London

In New York, one would go first to the Empire State Building to get a bird's-eye view. But London has no real skyscrapers; even buildings erected in recent years average only six stories above the ground, while before that four stories was the average. Remembering that London is of the past as well as of the present, we should choose a starting place that will swing our view backward in time as well as forward. Let us choose the White Tower built by the Normans

soon after they came in 1066, a part of that great irregular structure, half fortress and half state prison, which stands at the southeast corner of the old mile-square walled city, and which we know as the Tower of London. Except for some scattered Roman remains, the Tower is the structure in London that will swing your thoughts farthest back. It is a pivot in history, and it is a pivot in geography, too; for it overlooks the Thames in a great sweep, with its miles and miles of inclosed docks; and it overlooks what is still called "the City"—the center of the banks and the money exchanges and the produce marts.

Any guidebook, or policeman, of whom there are 16,000 in London, will tell you how to go to "the Tower." You can go by the "tubes," which are the same as our subways; or you can go down the river in a little launch for a few pennies; or you can take any one of several lines of 'buses. First of all, you are impressed by the high massive thick stone walls. You will see only three such walls in all America—at Quebec, at Pensacola, in St. Augustine. These Tower walls were built in an age when men

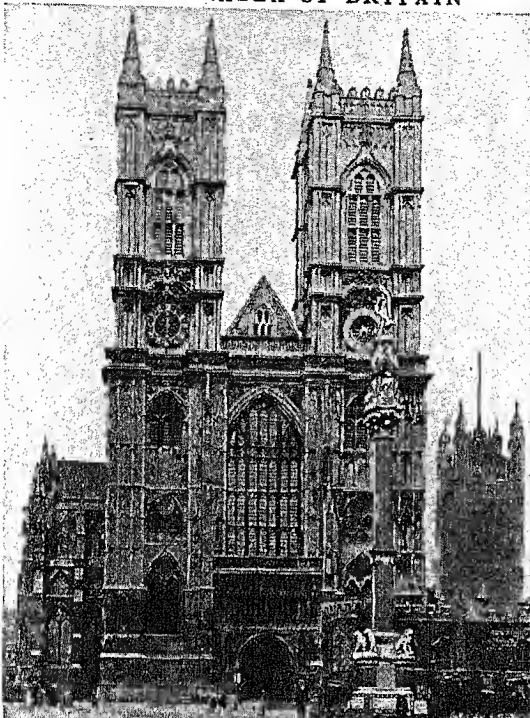
still fought with bow and arrow. They antedated gunpowder, and the biggest battering ram would be powerless against them. Bastion towers are

placed at each corner of the wall, and there is a moat, with a drawbridge across it, which can still at need be flooded with water. Indeed, the Tower has all the parts of a medieval castle—moat and wall, outer and inner wards, "donjon" or keep, with the usual arrangement of battlements, towers, portcullises, winding stairs, and the like.

Let us suppose we approach the Tower from the river. To your right as you land at Tower dock stairs is the wonderful Tower Bridge built like a Norman fortress; to your left London Bridge, across which flow great streams of traffic. At the Lion's Gate, on the western side, you obtain your admittance tickets, and proceed through the Middle Tower, cross the moat by means of a drawbridge, and enter the outer ward. Right at the entrance you get your first shock, that seems to

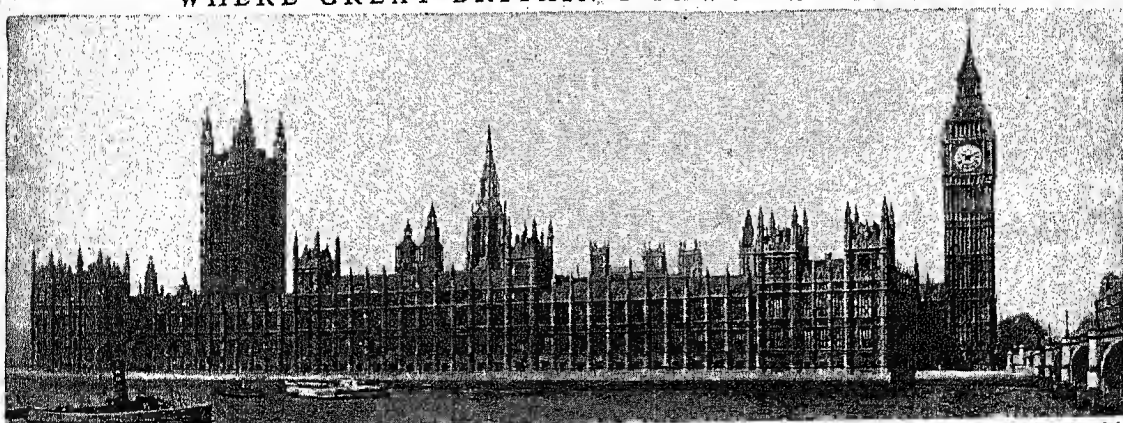
carry you back exactly 400 years. The sentry or "warder" isn't in khaki, nor is he in the red and blue trousers that is the traditional uniform of the English

THE VALHALLA OF BRITAIN



Here in Westminster Abbey lie buried 13 kings of England and 5 sovereign queens, countless statesmen, soldiers, poets, scientists, and men who have won fame in every line of human endeavor. Here, too, every king or queen of England has been crowned since Christmas Day, 1066, when the royal crown was placed on the head of William the Conqueror.

WHERE GREAT BRITAIN'S LAWS ARE MADE



Unlike most of London's famous structures, the Houses of Parliament are modern (completed in 1867), and they are so placed, with their east front directly on the Thames, that the full sweep of their length makes a vista of imposing beauty. Externally the chief features are the Victoria Tower, 340 feet high, at the left, and the St. Stephen's or Clock Tower, 318 feet high. The dials on the clock are 23 feet in diameter, and Big Ben, the famous bell in the tower, weighs 13 tons. The building is in the perpendicular style and covers an area of eight acres, containing 1,100 apartments.

Tommy. He is a resplendent being with close-cropped beard, scarlet doublet, and knee breeches, for all the world like an old colored print of Henry VIII, who married so many wives! The warders are called "Beef-eaters," perhaps because of their ruddy well-fed appearance. They are all old soldiers with honorable records.

A "LIFE GUARD"



The Life Guards are the household troops or bodyguard of the sovereign. Their dress uniform is most colorful and picturesque: scarlet tunics are set off by plumed steel helmets, white buckskin breeches, and long black knee boots.

turn to your left and enter Wakefield Tower. Here are the crown jewels of Great Britain—the crown made for Charles II in 1661, and which Colonel Blood and his accomplices tried to steal ten years later; crowns of later sovereigns, of the Prince of Wales, and of the queen consort; a great uncut ruby once given to the Black Prince, and later worn by Henry V at Agincourt; scepters of state, royal spurs of gold, a silver-gilt baptismal font for the royal children; a model of the great Kohinoor diamond (the original is in Windsor Palace); and a host of other priceless trinkets. A single crown—that worn by Victoria at her coronation and altered in 1902 for Edward VII—contains 2,818 diamonds, 300 pearls, and other gems. Such magnificence fairly takes one's breath away.

Passing into the inner ward under the Bloody Tower, we find at last the object of our quest—the White Tower, the original donjon or "keep" of the fortress. In its historic hall occurred the abdication of Richard II in favor of Henry of Lancaster (1399); and under its winding stairs, inclosed in the massive wall, were discovered in 1674 the bones of the two young princes—King Edward V and his brother—murdered by order of their uncle Richard III. On the upper floors is a wonderful collection of old arms and armor, giving a faithful picture in orderly succession of English war array from the days of Edward I (1272) to those of James II (1688). The

series includes a number of mounted knights in full armor, as well as many armored figures on foot.

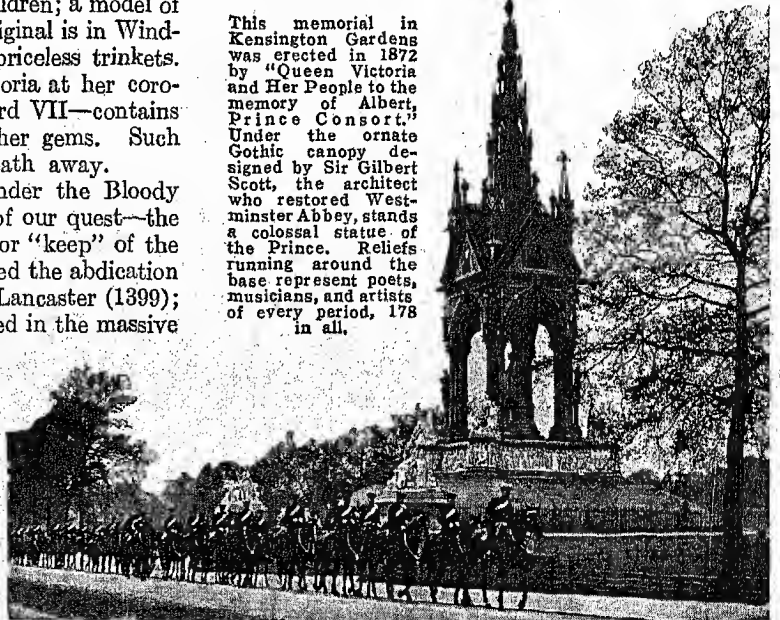
What a panorama of history this collection presents, and what thoughts come to one, dreaming of bygone days in the heart of the Tower! Of late years the Tower has been used only for museum purposes. But everywhere you find abundant traces of its former use as a fortress and state prison. Up and down its stone stairs once clanked the armored tread of medieval barons. From the days of the Normans to the days of the Tudors the Tower kept its character of castle and was frequently the royal residence. Charles II was the last sovereign to sleep within its walls, on the night before his coronation (1661). Numerous are the famous persons who at one time or another were confined in the Tower. Wallace and Bruce, the Scottish patriots, were among the number; and also Sir Thomas More, poor Anne Boleyn, and Queen Catherine Howard, who were all beheaded here in the days of Henry VIII. Gentle Lady Jane Grey was another victim; and the future Queen Elizabeth passed anxious weeks in her princess days, a prisoner in the Tower, while her fate trembled in the balance. Here, too, Sir Walter Raleigh whiled away tedious years writing a 'History of the World' while awaiting his tragic end. In this stern old fortress, also, were imprisoned and shot a number of German spies in the World War of 1914-18. With every breath you take within its walls, you breathe in English history.

The Vast City and Its Puzzling Streets

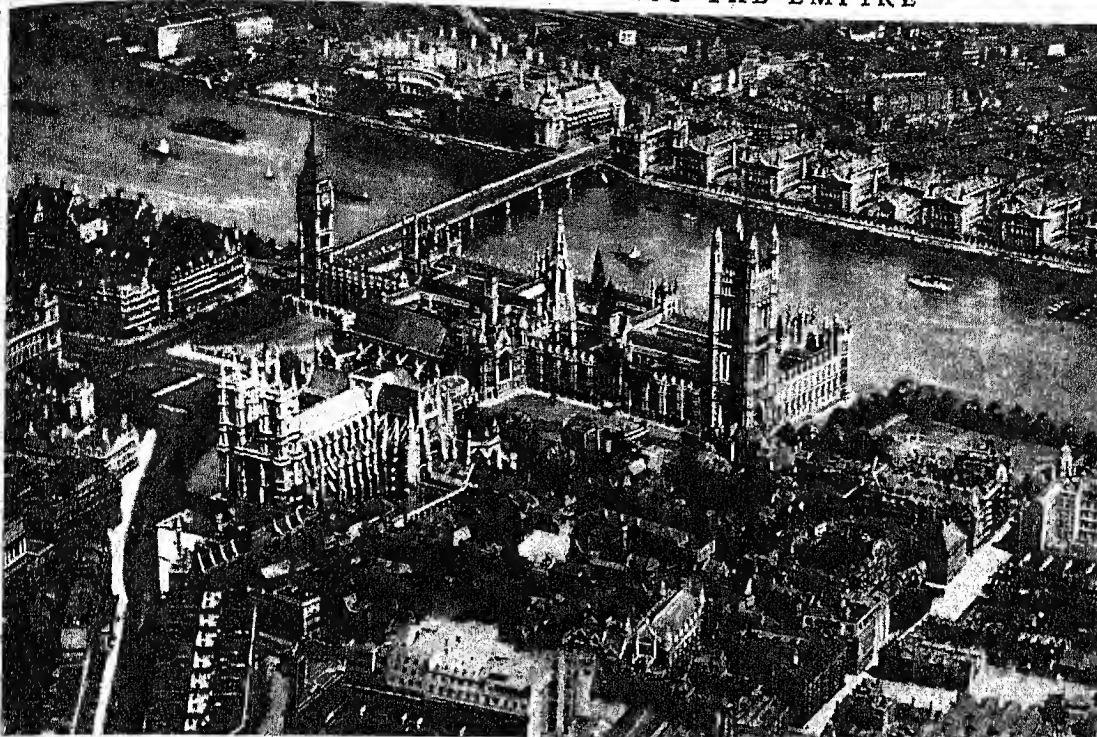
But let us hurry to the upper chambers and look out through one of the deep casement windows. London lies below us, busy as a disturbed ant-hill—London, the "city of Lud," an ancient king of the Britons who ruled his clans in their flimsy huts on the marshy

THE ALBERT MEMORIAL

This memorial in Kensington Gardens was erected in 1872 by "Queen Victoria and Her People to the memory of Albert, Prince Consort." Under the ornate Gothic canopy designed by Sir Gilbert Scott, the architect who restored Westminster Abbey, stands a colossal statue of the Prince. Reliefs running around the base represent poets, musicians, and artists of every period, 178 in all.



THE THROBBING CENTER OF THE EMPIRE



Here we are looking down from an airplane at the political and spiritual heart of the British Empire. The sluggish river Thames, which here flows north, is spanned by Westminster Bridge. Rising sharply from the corner near the Bridge, is the famous Clock Tower of Big Ben. The building of which it forms a part is a section of the vast Houses of Parliament. Nearer and to the left we see the stately Westminster Abbey, with Victoria Street sweeping on toward Parliament Square.

shores of this "pool" of the Thames, in the days before the Romans conquered the land. Here was the first firm ground on which vessels from the sea could land their goods, and here was the lowest point at which the river could be forded or bridged, so roads converged at this point and London grew to the mighty giant of today. Romans built the first bridge, where we see the Tower Bridge turrets. King Alfred the Saxon added to the city's fortifications; and William the Conqueror built the Tower, as we have seen.

Let us get the "lie" of the city as we look out from the Tower! The Thames sprawls like a great, broad muddy S to the west and south and winds its sluggish course 40 miles eastward to the sea. When the Tower was built London had about 30,000 people. When New York was a village in the 1700's, London housed 900,000 people. Today Greater London covers 693 square miles and has a population of about 8,200,000. If the streets were laid out end to end, they would make a paved driveway from New York to San Francisco. Of churches, it has 1,500. In London are more Scotchmen than in Aberdeen, more Irish than in Dublin, more Jews than in Palestine.

What puzzles you at first is the way the streets twist and turn. But as you look from your casement window in the Tower, you see that these higgledy-piggledy streets that seem to criss-cross every way—so different from American cities laid out in oblongs and

squares—really run parallel with the "S" of the river. We are right in the heart of business London, with the Mint and the Bank of England, the Stock Exchange and Custom House, and innumerable counting-houses, brokers, and insurance offices. Away to the east are the "Pool" of the Thames and the docks of the great Atlantic liners and the East India vessels, and the freighters for three-quarters of the world's commerce; and there too are the slums and terrible poverty of Whitechapel, the heart of all that is most wretched amid the splendors of historic London.

The Old Lady of Threadneedle Street and Her Neighbors

But in the neighborhood of the Tower you could hardly shoot an arrow without its dropping into a street famous in finance and history. Lombard Street, Threadneedle Street, Cornhill, and Leadenhall Street are narrow little streets famous for banking and finance, the first being named after the Italian merchants and bankers who settled there in the 14th and 15th centuries.

The Bank of England—"the Old Lady of Threadneedle Street"—lies just northeast of the Tower. There are no windows in the external walls of the old bank, light coming from roof lights and glazed domes; but the upper stories built on the main structure have regular windows. Here is one of the world's great financial centers. Up to the time of the World War, this was the sole British bank with the power to issue

paper money. There are several thousand clerks under its roof, and seldom less than \$100,000,000 in gold and silver, and \$125,000,000 in notes.

Everywhere hereabouts are historic memorials. Alexander Pope, the poet, was born in a little side street just off Lombard Street. Samuel Pepys, the famous diaryist, who spent his days in the Admiralty offices, lived not far from Tower Street. Radisson, who reached the Mississippi River 18 years before Marquette and Joliet, had a house near Pepys, only a few minutes' walk from the Tower; and that is how Pepys got all Radisson's papers of discovery. The Hudson's Bay Company, which dominated half of North America for two centuries, had offices (and have yet) in Lime Street, just a few steps from the Bank of England. Hogarth the engraver had quarters here in his heyday; and Addison the essayist was married in a little church off Lombard Street. To the west of the Bank of England is the Mansion House, the official residence of the lord-mayor of the "city" of London (the metropolis as a whole has no mayor). Only a stone's throw behind the Mansion House is St. Paul's, the cathedral of the Bishop of London.

Books have been written about St. Paul's. It is as famous as is Westminster Abbey, which we shall visit presently in the West End. Legend says it is built on the site of a temple to Diana, replaced by the Romans with a Christian church, which in turn was torn down by the pagan Saxons. Old St. Paul's, famous in Reformation days, was built about 1160. The present building was planned by the great architect Sir Christopher Wren, and is one of more than

50 churches constructed by him after the Great Fire in 1666 had destroyed about four-fifths of the London of that day. The present St. Paul's is in the form of a Latin cross, measuring 500 feet in length the long way and 250 feet through the short arm. It is crowned by a magnificent dome, the extreme tip of which is 364 feet from the pavement. The diameter

of the dome is 102 feet, or 37 feet less than St. Peter's in Rome. The greater part of the money for rebuilding St. Paul's was raised by a tax on coal.

Just as Westminster Abbey—which we shall describe when we come to the West End of London—has become the Valhalla of the great British dead for many centuries past, so St. Paul's has become a sort of second Hall of Fame for the dead of the past hundred years. Historians like Henry Hallam, artists like Lord Leighton and J. M. W. Turner, soldiers like Gordon of Khartum and the "Iron Duke" of Wellington, are here commemorated in bronze and marble. Their tombs are in the crypt below, which runs the whole length of the church. In that resting place are the tombs of Sir

Christopher Wren himself, and of Deans Liddon and Milman who won fame by their writings as well as through their offices as custodians of this great church. Under the center of the dome, in the crypt, stands the black marble tomb of Admiral Horatio Nelson, Britain's greatest naval hero.

And what a host of associations cling round the little by-streets close to St. Paul's! St. Paul's Coffee House and the Queen's Arms and Cheshire Cheese taverns, only a few steps from St. Paul's, were frequented by Dr. Johnson and Oliver Goldsmith, and

TRAFALGAR SQUARE AND THE NELSON MONUMENT



The marble column to the memory of Lord Nelson, whose statue surmounts it, was completed in 1843, but the four lions, modeled by Sir Edwin Landseer, were later added at the corners. On the far side of the Square is St. Martin's-in-the-Fields, whose fine Corinthian portico is one of the choicest examples of the classic style in architecture, which was in vogue in the 18th century.

FLEET STREET, LONDON'S "NEWSPAPER ROW"



Fleet Street is the winding way leading to the majestic west front of St. Paul's, whose dome is dimly visible in the distance. The street is noted for its many newspaper offices and printing establishments. "The Fleet" was once a small stream emptying into the Thames, but it has long since been covered and now flows under the street through a conduit.

by the Americans Washington Irving and Benjamin Franklin. Little folks may like to remember that the first books issued for children were printed by John Newbery, a publisher here, and Goldsmith is supposed to have helped to write 'Goody Two Shoes' and 'Mother Goose'. Old smelly book-stalls still flank St. Paul's, where you can pick up treasures—perhaps a volume of Dr. Johnson's essays, bound in musty calf, or an early edition of Keats' 'Endymion', or a shabby, well-thumbed Scott's 'Ivanhoe'.

Let us take a final look from our window in the Tower, before betaking ourselves to the West End, where we shall find the center of government, wealth, and fashion, as the East End is of finance, shipping, and poverty. As an approach to this gilded region let your eye follow westward up the straggling Thames, and you will see one of the most wonderful drives in the world—the Thames Embankment.

The Embankment runs along the north bank of the Thames from the Parliament buildings in Westminster more than a mile upstream to Blackfriars Bridge, a mile or so west of where you are standing. The driveway is 64 feet wide and a footpath 20 feet wide runs along the river side. Rows of trees line footpath and drive, and seats are placed at intervals beneath the trees. By daylight there are few more animated scenes in London, for along the Embankment way motors and 'busses stream to the "city" in the morning and back in the afternoon, while shuttling up and down

the Thames are boats and river craft of every description under the sun—wherries, electric launches, private yachts, latteen sails, three-masters, ferries, small passenger boats, sculls, row-boats, canoes, market punts, even vegetable rafts. By night, the land traffic ebbs to a few motor cars and taxis, and perhaps an occasional horse-drawn cab.

Between the Embankment on the one side and the Strand and its continuation, Fleet Street, which are part of the first of the important east-to-west thoroughfares of

London, are some of the most famous landmarks of the British Empire. The Temple is the first of these we will notice. Really it is not a "temple" at all, but gained its name long ago, because here was the London stronghold of the crusading order of Knights Templar. For centuries the buildings here have been inhabited by young men studying to be "barristers," or lawyers, and its name has become famous in history and literature. Goldsmith and Charles Lamb and Thackeray all occupied apartments in the Temple. There are interesting "gardens," a wonderful old church, and a hall where Shakespeare's first plays were acted and Queen Elizabeth used to dine.

A half-mile to the west lies Whitehall. Its grandeur dates back to the great Wolsey, the discarded favorite of Henry VIII, for here was Wolsey's London residence as archbishop of York. After his fall it became crown property and was renamed Whitehall. It became a palace of regal splendor under the Tudors



One of the "Bobbies" who make London the best-policed city in the world.

and the Stuarts; but only the great Banqueting Hall remains; and its memories are chiefly of tragic history. It was here that Henry VIII met Anne Boleyn, and here the selfish old voluptuary died. It was through an opening made in the walls that Charles I was led out to execution on a scaffold erected in the street. Cromwell lived here; Milton wrote state papers here; Charles II held here the wild orgies of his court and died with the name of poor Nell Gwynn on his failing lips. In the center of Whitehall stands the majestic cenotaph erected to the memory of those who died in the World War. In Whitehall Street are also the chief government offices of the Empire—the War Office and the Admiralty, the Treasury and the India Office and Colonial Office, and all the rest. The official residence of the Prime Minister, the head of this vast governmental machine, is in a little by-way called Downing Street. And near by down towards the Thames is that place of mystery and exciting romance—New Scotland Yard, headquarters of the Metropolitan Police.

The Political Heart of the Empire

On the Thames side are the Houses of Parliament by Westminster Bridge, and at right angles to them is Westminster Abbey. Here is the heart of the British Empire; here beats the political pulse for a quarter of the people in the known world. It would take a book to describe either the Parliament Buildings, or Westminster Abbey; and even then each visitor would carry away a different memory. The Old Parliament Building was burned in 1834 when an impatient janitor overheated a flue in burning up wooden "tallies" or receipts which had accumulated in the Treasury in the course of six centuries. This gave opportunity to erect the present beautiful Gothic building, covering an area of eight acres. In their respective chambers sit the House of Commons and the House of Lords, amid surroundings of the highest historic significance.

Westminster Hall, which was begun by the conqueror's son, William Rufus, and remodeled by many of his successors, still stands and serves as a vestibule to the Houses of Parliament. Here were held some of the earliest Parliaments. In this hall occurred the coronation feasts until early in the 19th century. Here Edward III entertained the captive kings, David of Scotland and John of France; and here Edward II and Richard II were declared deposed. In this historic hall Charles I was tried and condemned to death by a high court set up by Parliament; and from this hall Cromwell a few years later turned out the "Rump" of that Parliament, locking the door and putting the key in his pocket!

But perhaps the visitor will remember best of all "Big Ben," the great bell in the Clock Tower at the north end of the Parliament Building, next to Westminster Bridge. The four clock dials are 23 feet in diameter and the bell is 9 feet across at the mouth and weighs 13½ tons. On account of a crack or flaw the tone at first became shrill, but since the

crack was filed open the tone has been quite pure. In calm weather the voice of Big Ben can be heard over the greater part of mighty London. The throne chair, the seats of the Lords and the Commons, the numerous portraits and statues of great men—what are these to Big Ben booming forth the hours at the heart of the Empire! Lords and Commons seem only bubbles in the froth of time. "Hurry up! Hurry up, England! and follow 'round the world after the sun, which never sets upon your flag!" So Big Ben seems always to be saying above the city's roar.

Just across the street from the Houses of Parliament stands Westminster Abbey, founded by Edward the Confessor and added to by his successors until it became the superb Gothic church that it is today. What could be more amazing than the "fan vaulting" of the chapel of Henry VII, composed of giant masses of intricately carved stone, hanging like airy cobwebs from the interlacing ribs of the ceiling?

In Westminster Abbey, you are in an altogether different atmosphere from any other place in the world. Here is enshrined England's past, the history of her national soul; here are royal burial vaults and innumerable tombs and monuments of illustrious men. It is not so large as St. Paul's cathedral, and it has never been a bishop's seat. But it is draped with awe and veneration, from the Poet's Corner, where the names read like a catalogue of English literature, to the Saint's Crypt and the Little Chapel, where the monarchs of England are done in wax, all togged out in their faded tinsel and finery! One of the most pathetic of tombs is that of the Unknown Soldier of the World War, in which are honored also the many thousands of other nameless British heroes of that great conflict. You could spend hours studying the architecture, or reading over the epitaphs, or conning a history that goes back to the Danes. But in the end you will sink exhausted in one of the rear pews to let the floods of the choir roll over your soul and the subdued light of the great "rose window" lift your thoughts to things far away and sublime.

The Work of Greatness

Then any sense of disappointment you may have felt is gone forever. England points back to before history, and forward to after history; and it is not because of the greatness of her island and colonial possessions. It is because of the greatness of her sons' and daughters' souls. It is they who have made her great, not material things—great on sea, on land, great in drama and art, great in learning and integrity, great in dauntlessness and freedom.

We shall not have time to go to St. James's Park, not far from Westminster Abbey, and visit Buckingham Palace and St. James's Palace—even if we could gain admission. The first impression of these royal palaces would probably be one of disappointment. St. James's Palace has not been used as a royal residence since 1861, when the Prince Consort, Queen Victoria's husband, died. Buckingham Palace is hardly as imposing as many of the great hotels and private

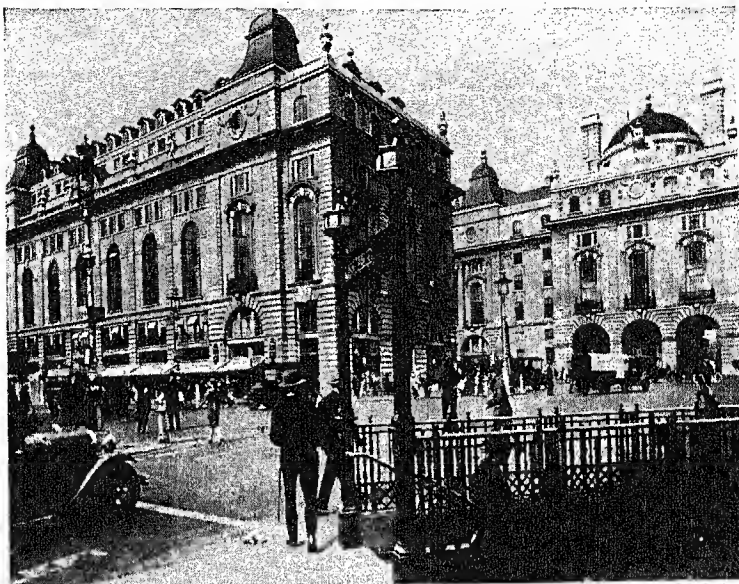
residences of New York or Chicago. It is neither the luxury nor the beauty of British palaces that makes them dear to the British heart, but what they stand for—a sort of keystone to the arch of self-government. Compared to the beautiful chaste White House in Washington, there is not a palace in all London that does not look dingy and dark and grim.

Westward of St. James's Park is the famous Hyde Park, a vast expanse of 390 acres (with Kensington Gardens, which it adjoins, 630 acres), which was once a royal park but is now a people's pleasure ground. On Sundays and holidays it is thronged with people. Many of them gather in good-natured knots about impromptu orators, who are permitted to speak freely on almost any subject they desire—religious, political, economic, or what not. It is one of the safety-valves of the British constitution. Regent's Park lies a mile to the north, with its zoological garden showing the animals in their natural surroundings—one of the great zoos of the world.

Let us now take a 'bus and ride down Piccadilly from Hyde Park Corner, viewing residences and clubs from the 'bus top—a favorite method of sight-seeing. You may be surprised to discover that Piccadilly Circus,

in Washington City. Here we are in the heart of the great theatrical district of London, while to the north is the curious old Italian quarter called Soho, famous for its many table d'hôte restaurants.

THE MOST POPULAR "CIRCUS" IN LONDON



This is Piccadilly Circus, one of the busiest points in London. In England the word "circus" is applied to a round open space, at the junction of several streets. Piccadilly Circus is the heart of London's theatrical district, and everywhere around are high-class retail shops.

AN AMERICAN AMONG ENGLAND'S HEROES



In Trafalgar Square, a stone's throw from the Nelson Memorial and monuments to other great Britons, is this bronze statue of George Washington. The statue is a copy of the well-known figure by Houdon, and was in 1921 "presented to the people of Great Britain and Ireland by the Commonwealth of Virginia" to symbolize the indissoluble spiritual union of the two great English-speaking nations.

from which radiate Regent Street, Shaftesbury Avenue, Coventry Street, and others, is not a "circus" at all in our sense, but only one of a number of circular spaces, like the circles which are so numerous

Our 'bus turns down Haymarket—a name reminiscent of other and more rural days—and presently we are at Trafalgar Square, with its tall column crowned by the figure of Nelson. This is the time-honored center for British demonstrations of the people, whether it be against unemployment, in favor of "votes for women," or what not.

Near Trafalgar Square is the National Gallery. About a mile below it, on the Thames, is the Tate Gallery, one of the most truly national things in the British Empire, for it houses special collections of British art, all provided by generous donors. But a whole day would be needed for even a casual inspection of the art works which they contain. When you go there perhaps you will be struck by the many interpretations of the sea in its myriad moods—boys listening to old Spanish mariners spinning yarns of the Spanish Main, Turner's wonderful pictures of the secret of Carthage's greatness, two little children playing in the sand, and the like,—for it was the sea that led Englishmen around the world.

Just as the National Gallery and the Tate Gallery are the most national things in England, so—with the exception of its great collection of books and old manuscripts, of ancient folios and Bibles, which is the finest in the world—the British Museum is one of the most *un*national things in all England. Its massive halls—about a mile north of the National Gallery, beyond Oxford Street—are essentially British, but its collections on archaeology are far better for Rome and Greece and Egypt than for the British Empire.

Here you may see the famous Elgin marbles—the original sculptured slabs that once adorned the Parthenon and other temples of Athens, and that were brought to London by Lord Elgin between 1801 and 1812. Here are the remains of the Mausoleum at Halicarnassus, and of the Temple of Diana at Ephesus, both excavated by British scholars. In the Babylonian and

Assyrian section you find remains dug up at Nineveh and elsewhere—giant human-headed bulls and lions, life-sized slabs showing wars and lion hunts, cuneiform inscriptions, until one's head reels with the thought of the far-off history to which they refer. And then the Egyptian rooms, with the Rosetta Stone whose parallel inscriptions enabled scholars to unlock the secrets of hieroglyphic inscriptions; and mummies and mummy cases, and statues, glass objects, painting, and papyrus without end. After these relics, which have served to unlock whole eras of forgotten history, the collections of Etruscan antiquities, of Greek vases and terra cottas and of later Asiatic remains seem almost modern.

When you emerge from the Museum you feel the need of fresh air and perhaps go for a bus ride to Chelsea, where George Eliot and Carlyle lived and worked, and saddened in their toil. You have only touched here and there the central parts of metropolitan London. To the north lie enormous areas, such as Hampstead Heath and Camden Town. To the east are Greenwich and Woolwich—the one the seat of the national observatory on the central meridian of longitude, the other of the great British military academy. To the south of the historic river are Battersea and Lambeth, and to the west Chelsea, Walham Green, and distant Richmond, with its lovely expanse of park.

Though you should tarry a year in London, and give every day to sight-seeing, you could not begin to exhaust the interest and the wonder of this giant city.

Landmarks in Its Long History

London became a place of importance under the Romans, probably first in 43 A.D. It was burned by

the Britons under Queen Boadicea in 61 A.D. From 369 till 412 it was the capital of Roman Britain. Bede calls it a "princely town of trade," when it was the capital of the East Saxon kingdom. King Alfred restored the city after it had been burned and the Roman walls destroyed by the Danes. London, already rich and prosperous, sided with the House of York in the Wars of the Roses. The principles of the Reformation were welcomed and the suppression of monasteries and the confiscation of their property

under Henry VIII made him popular, though the same treatment of the gilds lost the Duke of Somerset the favor of the citizens. Under Queen Elizabeth new openings for adventure in America and India gave a great impulse to the city's trade. London was a powerful aid to Parliament in its war with Charles I and the city's "trained bands," made

up of Puritan apprentices, fought on many a bloody field. The plague which had several times visited London, in 1665 destroyed one-fifth of the population; and the Great Fire of 1666 burnt 436 acres of houses.

The streets were first lighted by lanterns in 1415 and by gas in 1807. They were first paved in 1533. Omnibuses began to run on regular routes in 1829; the Metropolitan Underground was opened in 1863, and the first "tube" in 1890. These now consist of about 700 miles of railway, included with the busses, trams, and "Green Line" coaches in one vast undertaking known as London Transport.

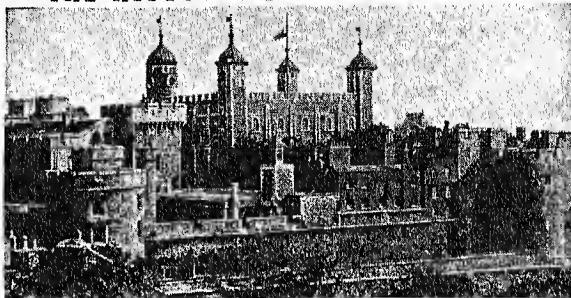
London has many educational establishments, chief of which is London University. There are also famous public schools, including Westminster, St. Paul's, and the City of London.

The resident population of the square-mile "City" (within the Roman walls, the gates of which have given their names to streets like Aldgate and Bishopsgate) is less than 11,000. In addition, London comprises 28 metropolitan "boroughs," each administering its own affairs. The London County Council takes care of most matters concerning London as a whole. It consists of the chairman, 20 aldermen, and 124 councillors. The "City" is governed by a Lord Mayor, 25 aldermen, and more than 200 common councilors.

The administrative county of London and the City together cover 117 square miles and have a population of 4,385,000. What is known as Greater London includes the Metropolitan Police District and the City of London Police District, and covers an area of 693 square miles, with a population of 8,200,000.

Recent years have worked great changes in the appearance of London. Hundreds of historic buildings

THE HISTORIC TOWER OF LONDON



No spot in London calls up more memories of historic names and events than the Tower. This moated Norman fortress still stands guard over the eastern boundary of "the City," but it is used chiefly as a museum.

and mile upon mile of houses, shops, and offices were destroyed by German aerial bombardment in the second World War. Many other landmarks, including St. Paul's, Westminster Abbey, Buckingham Palace, the Temple, the Tower, the British Museum, the National Gallery, and the Houses of Parliament, suffered shock damage.

Similar though far less extensive damage during the first World War (1914-1918) had previously brought many changes. In the 20 years' interval between the wars, vast building enterprises were undertaken. Blocks of small buildings were replaced by huge structures, such as Broadcasting House, headquarters of the British Broadcasting Corporation. Many parts of the East End, the crowded manufacturing and shipping district which contains the worst slums, were also transformed by the construction of dwellings subsidized by the government.

LONDON, ONTARIO. Like the famous city of England from which it takes its name, London, a metropolis of eastern Ontario, is situated on a river Thames. The site was chosen and the names of the town and river given by Governor Simcoe in 1792, but no building was done until 1826. When London was made the judicial center of the district soon after 1826, its real growth started. In 1854 it became a city. It is now the financial, industrial, marketing, and distributing center for a rich and thickly settled agricultural section. It is 23 miles north of Port Stanley, a harbor on Lake Erie, with which it is connected by a municipally owned and operated railway. Electric power from Niagara Falls, about 130 miles east, adds to the city's advantages as a manufacturing center. Among the many industrial establishments are hosiery and textile mills, box and clothing factories, and foundries and machine shops. The University of Western Ontario, founded in 1878, is situated in London. The population is 71,148.

LONG, CRAWFORD WILLIAMSON (1815-1878). On March 30, 1842, Dr. Crawford Long, a young surgeon of Jefferson, Ga., performed the first recorded operation on an anesthetized patient. He administered sulphuric ether before removing a tumor from the neck of James Venable, who felt no pain during the operation. Although the experiment was a complete success, Dr. Long did not make his work public until 1849, after he had used ether in more operations. Meanwhile the benefits of surgical anesthesia had been proved by others, and Dr. Long's delay in reporting his discovery kept him for many years from being recognized as the pioneer anesthetist (see Anesthetics).

Dr. Long was born at Danielsville, Ga. He entered Franklin College (now the University of Georgia) at the age of 14, and took his medical degree at the University of Pennsylvania in 1839. After 18 months of work in New York City, where he became recognized as a skilled surgeon, he returned to Georgia to practise at Jefferson.

How Dr. Long Made His Discovery

Strangely enough, Dr. Long's discovery of anesthesia was made as the result of a prank. A few weeks before the famous operation, some gay young friends of

his saw a traveling medicine vendor demonstrate a new curiosity, laughing gas (nitrous oxide). Volunteers who inhaled this gas felt extremely exhilarated. Dr. Long's friends then asked him for permission to hold a "nitrous oxide frolic" in his room. Since he had no nitrous oxide, he gave them sulphuric ether. Excited by the gas the young men became hilariously rowdy and pommelled one another severely. Dr. Long noticed with amazement that none of them seemed to feel pain, and decided to experiment with ether in his surgical work.

After his notable achievement Dr. Long continued to live the quiet life of a country doctor. In 1850 he moved to Athens, Ga., where in 1910 an obelisk was erected to his memory.

LONG BEACH, CALIF. Far-sighted industrial and civic planning and the discovery of large oil fields have developed beautiful Long Beach from a small fishing village and seaside resort into one of California's chief cities. It lies 20 miles south of Los Angeles on a strip of coastal plain between San Pedro Bay and the snow-crested Sierra Madre Mountains. The city is built on a terrace along the miles of shining white bathing beach which make it a favorite ocean resort. Looming up behind Long Beach, right in its "back yard," are scores of towering oil derricks.

The amazing development of Long Beach began in 1921 with the discovery of petroleum on Signal Hill, within the city limits. Extensive working of the great oil field soon made the Long Beach region one of the nation's chief producers of petroleum. The city owns one-sixth of the field and derives a large revenue from this share.

Manufactures, Commerce, and Tourist Trade

Many industries soon came to Long Beach to take advantage of the cheap fuel provided by the oil and natural gas from Signal Hill field. They include oil refineries, aeronautical, shipbuilding, and automobile plants, woolen mills, vegetable oil plants, gypsum works, soap factories, canneries, and packing houses.

Ambitious Long Beach furthered its growth by improving the fine natural harbor which it shares with the city of Los Angeles. The Los Angeles-Long Beach Harbor, as it is officially called, is one of the greatest on the coast. It has two ports, one operated by Los Angeles, the other by Long Beach. Beginning in 1925, Long Beach spent approximately \$7,000,000 in 12 years to develop its own port.

The city's mild climate attracts thousands of tourists every year. Catering to visitors is still a major business. Surf bathing, boating, and fishing are popular year-round sports. There is a \$3,000,000 Civic Auditorium on the ocean front, a Marine Stadium on Alamitos Bay, and a municipal airport.

Long Beach was founded in 1881 by W. E. Willmore, an Englishman, and named Willmore City. It was incorporated as a city under its present name in 1888. It is governed on the council-manager plan. The school system includes evening classes for adults and a junior college. Population (1940 census), 164,271.

LONGFELLOW, *Best Loved of* AMERICAN POETS

LONGFELLOW, HENRY WADSWORTH (1807-1882).

Except for one tragic stroke of fate, Longfellow's life was one of singular serenity and calm. Most of it was spent in the beautiful old Craigie House at Cambridge, Mass., which often echoed to the laughter of children and the eager talk of his many devoted friends. His poems struck so deeply into the hearts of people, both at home and abroad, that he became the best-loved poet of his generation. His works were translated into German, Dutch, Swedish, Danish, French, Italian, Portuguese, Spanish, Polish, and Russian. 'A Psalm of Life' was inscribed in Chinese on a fan as a gift to the poet; and 'Hiawatha' was translated into Latin as a stunt.

His Life in Brief

Longfellow was born in Portland, Me., Feb. 27, 1807. His father's family, of old English stock, had emigrated to America in the 17th century. The family of his mother, Zilpah Wadsworth, traced its descent to John and Priscilla Alden. Henry was an active, pleasant boy, fond of reading and music. His first published poem appeared in the local newspaper, the *Gazette of Maine*, when he was only 13 years old.

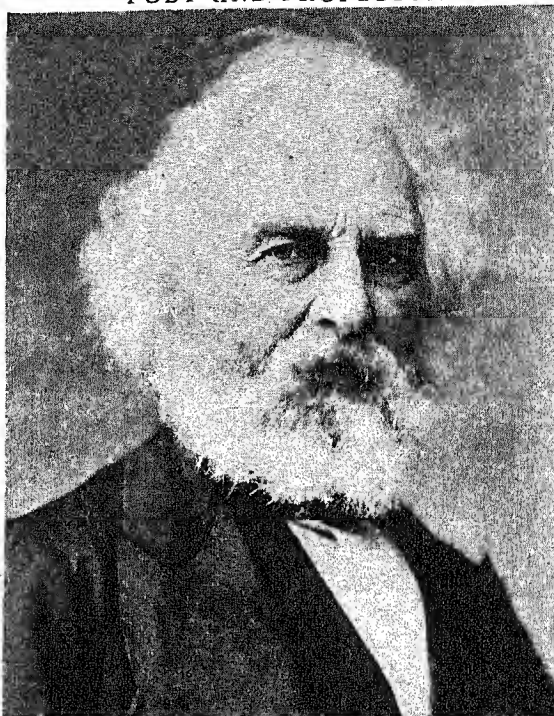
At 15 he entered Bowdoin College and was graduated in 1826, in the same class with Hawthorne. He was immediately offered a professorship of languages at Bowdoin, with the stipulation that he first study in Europe for a year. He remained abroad three years, studying in France, Italy, Spain, and Germany, and in 1829 took up his duties at Bowdoin. In 1835 he was appointed to a chair of modern languages and belles-lettres at Harvard University. Again he went to Europe to study before undertaking his new duties, taking with him his wife, the former Mary Potter of Portland, whom he had married in 1831. In Holland Mrs. Longfellow fell ill and died.

His frequent tours not only contributed to his extensive scholarship in modern languages (he was proficient in the classics as well) but also, as his fame became world-wide, brought him intimate friendships abroad, and honors such as degrees bestowed upon him by Oxford and Cambridge. A decoration from the king of Italy he courteously declined as unbecoming for an American citizen. In 1854 he gave up his chair at Harvard, but continued to live in Cambridge.

In 1848 he married Frances Elizabeth Appleton, heroine of his prose romance 'Hyperion'. Five children were born to her—George and Ernest and three daughters, whom children know as "Grave Alice and laughing Allegra and Edith with golden hair" from Longfellow's poem 'The Children's Hour'. His happy and peaceful years with his family were

broken in 1861 by a terrible tragedy. On an afternoon in July Mrs. Longfellow was soaping with wax some packets of her children's hair when her dress caught fire and she was fatally burned. From this shock Longfellow never fully recovered. He died 21 years later, March 24, 1882. He was buried at Mount Auburn, and in 1884 a memorial to him was placed in Westminster Abbey, London.

POET AND PROFESSOR



Longfellow was a striking figure, especially in later life. William Winter, the eminent critic, described him in these words: "His dignity and grace, and the beautiful refinement of his countenance, together with his perfect taste in dress and the exquisite simplicity of his manners, made him the absolute ideal of what a poet should be." His kindly smile, which reflected his generous and sunny soul, endeared him to all who knew him.

The Poet's Character and Friendships

The facts listed above are clues to Longfellow's character. His Portland boyhood (where the thoughts of youth were long, long thoughts), his love of Europe, his delight in Craigie House, reveal a combination of the provincial and cosmopolitan—the roots and the foliage. His polite refusal of the Italian decoration expressed reverence for Italy and its sovereign, and also his profound belief in American democracy and its tradition. He was received by Queen Victoria and the Prince of Wales, but there are more frequent allusions in his journals to people like "an Irish mason, whom I have seen now and then about new houses. I wished him good-morning, and joining me, he said, 'I am glad to speak to a poet. I have

meself a brother in the Port, who is a drunkard and a poet.'" He is more the true poet of democracy than Whitman, because he was accepted by the people, whereas Whitman remains the poet of the professional critics.

He loved the good things of this world, fancy waistcoats, vintage wines, good music, fine dinners. His journals abound in references to these dinners, at which he entertained the choicest spirits of the age. He had the gift of friendship, and numbered among his intimates Senator Sumner, Hawthorne, President Felton of Harvard, Agassiz, Lowell, Emerson, Prescott, Norton, Holmes, Howells, Dickens, Tennyson, and Carlyle. An impressive list, surely, representative of the wide range of his mind and heart. One letter to him ends thus: "Even your imagination cannot conceive how admiringly, tenderly, and truly, ever your affectionate Charles Dickens."

The gay and generous spirit which could call forth from all his friends such expressions of devotion was founded on a character utterly steadfast. Longfellow's

industry was unflagging, as the far from complete list of works below indicates. His knowledge embraced all literature, the classics of the ancient world, of Europe, Scandinavia, and ancient Iceland. During the years he was engaged in translating Dante, a "Dante Club" with a nucleus of three members—himself, Charles Eliot Norton, and James Russell Lowell—met Wednesday evenings at the Craigie House to discuss every phrase, every word, of his work in relation to the original. He employed almost all the forms of verse that English tradition has to offer, and even went to the Finnish epic 'Kalevala' for the meter of

'Hiawatha'. Nor was the steadfastness of his character revealed only in his work. The appalling tragedy of his second wife's death steeled him to a manly reticence which raised good taste to heroic proportions.

Yet he was the man of taste rather than of penetration. He was lacking in profundity and accepted too easily the limitations of his day. The darker aspects of human experience he shunned. His friend Hawthorne was a "mysterious man" to him, and 'The Marble Faun' was "a wonderful book; but with the old, dull pain in it that runs through all Hawthorne's writings." Again, "Dickens is always prodigal and ample; but what a set of vagabonds he contrives to introduce us to." The Greek Anthology was "the most melancholy of books." His genial optimism was the product of temperament and circumstance, not, like Lord Tennyson's, of a reasoned philosophy. Hence, it was shallow, and, by its refusal to recognize all the varieties of human experience, a definite restriction to his genius.

His Fame Then and Now

The rise and fall of Longfellow's reputation as poet is a result of the wide difference between our times and his. The qualities which made him the most popular poet of his age are uncongenial to ours.

He became identified with such moralistic pieces as 'The Village Blacksmith', 'Excelsior', and 'A Psalm of Life'; or such weak imitations of balladry as 'The

HISTORIC CRAIGIE HOUSE, LONGFELLOW'S CAMBRIDGE HOME



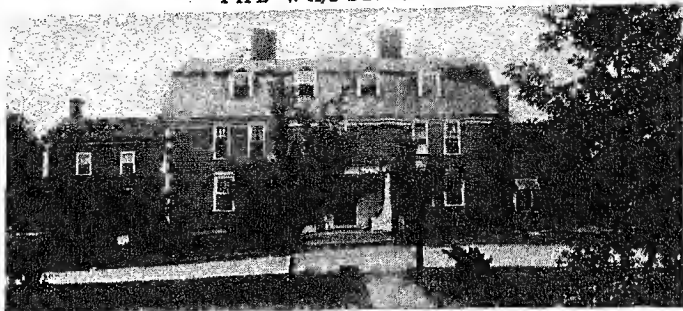
When Longfellow arrived in Cambridge in 1836 to teach at Harvard, he was fascinated by the venerable air of this fine old colonial mansion on Brattle Street and engaged a room in it. Built before the Revolution, in 1759, it had been for a time the headquarters of General Washington. When Longfellow married Frances Elizabeth Appleton in 1843, his father-in-law gave them the house for a wedding present. From that time Craigie House became a gathering place for Longfellow's many friends, and later, as his fame grew, a Mecca for admirers who came from afar to view the home of the popular poet. The house is now owned by the Longfellow Memorial Association.

Skeleton in Armor' and 'The Wreck of the Hesperus'. In the course of a memorial address Professor Norton remarked: "It was the felicity of Mr. Longfellow to share the sentiment and emotion of his coevals, and to succeed in giving to them their apt poetical expression. It was not by depth of thought, or by original views of nature that he won his place in the world's regard. . . ." And that was just the difficulty. The popular sentiments which please one's contemporaries are not likely to be popular with their grandchildren.

Furthermore, Longfellow's conception of American and English literature as essentially the same has been discarded. In 1844 he wrote: "As our character and modes of thought do not differ essentially from those of England, our literature cannot." But since those words were written, American literature has spread out beyond the limits of British culture.

Yet if Longfellow's work suffered from the limitations of his own age, it has suffered no less from the limitations of ours. There is no sound critical reason for the violence which the modern world demands from its authors. From a large point of view, Longfellow must be adjudged one of the great American poets. He rose far above his times in many of his translations, in splendid sonnets, in the interludes and finales of 'Tales of a Wayside Inn', in the 'Arsenal at Springfield' and some fifty other pieces. Though he was English in his culture, and cosmopolitan in

THE WAYSIDE INN



In colonial days this old inn at Sudbury, Mass., was called "Red Horse Tavern." Longfellow loved this ancient tavern, which had sheltered Washington, Lafayette, Webster, and other great Americans, and chose its parlor with the red brick fireplace as the scene of his 'Tales of a Wayside Inn'. Henry Ford has restored it as a memorial to the poet.

his scholarship, he was, at the same time, one of the first to use American themes as in 'Hiawatha', 'Evangeline', and 'The Courtship of Miles Standish'. Poe shunned the American legend; Whitman vaporized it; Longfellow quite simply accepted it as his natural heritage. A carefully selected volume of his work would place him back where he belongs—among our best. Critics are beginning to acknowledge the fact. In his fine book on Mark Twain, Bernard DeVoto writes: "Longfellow's judgments were colored by a wider world. It was a world of propriety, gently antiquarian and genteel, but it escaped from Massachusetts Bay. He lived deeply and he was—if the word is not too weary—an artist. Of his fellowship only Whittier and Hawthorne comparably deserved the designation, and Longfellow's art is more harmonious, more fully integrated, than theirs. There seems no reason to deny him that simple justice on the ground that the poetry he wrote

is not the poetry we venerate in the 1930's."

In the hearts of the common people, and above all in the hearts of children, Longfellow's place is secure. Even during his lifetime the public schools began to celebrate his birthday; and today there are few places where special tribute is not paid the

last week of every February to "the children's poet."

Longfellow's works include: 'Outre Mer' (travel sketches, 1835), 'Hyperion' (a romance in prose, 1839), 'Voices of the Night' (the first book of poems, 1839), 'Ballads and Other Poems' (1841), 'The Spanish Student' (a play, 1843), 'The Belfry of Bruges' (1845), 'Evangeline' (1847), 'Kavanagh' (a tale in prose, 1849), 'The Seaside and the Fireside' (1849), 'The Golden Legend' (1851), 'The Song of Hiawatha' (1855), 'The Courtship of Miles Standish' (1858), 'Tales of a Wayside Inn' (1863), 'The Divine Comedy of Dante Alighieri' (a translation, 1865-67), 'The Masque of Pandora' (1875), 'Kéramos' (1878), 'Última Thule' (1880), 'In the Harbor' (1882). A fine biography of Longfellow is the one by T. W. Higginson in the 'American Men of Letters Series'. A fuller account is the 'Life' by Samuel Longfellow. Young readers will enjoy Hildegarde Hawthorne's 'The Poet of Craigie House'.

Longfellow's 'Evangeline' and 'Hiawatha'

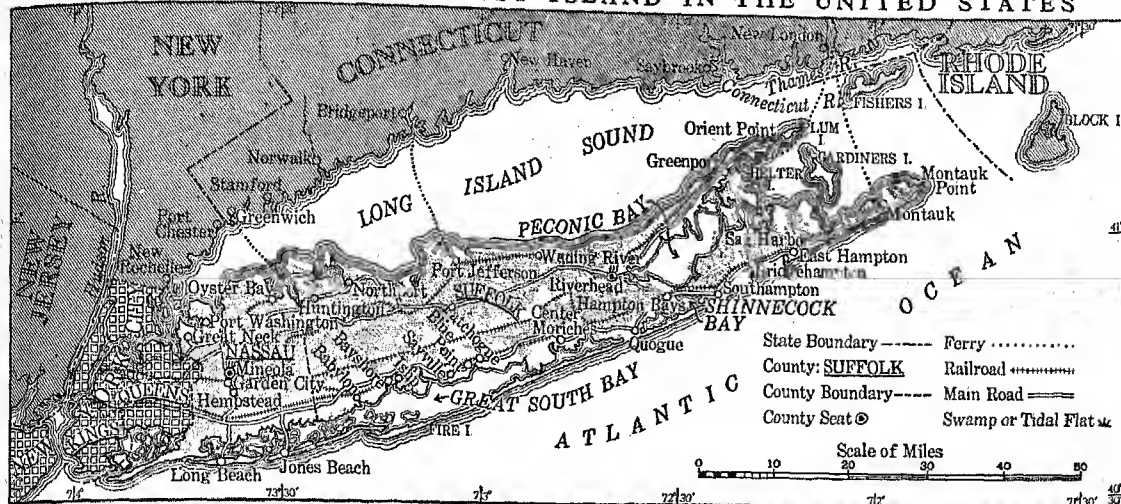
Evangeline. Though we may not agree with Oliver Wendell Holmes that the opening line of 'Evangeline' is to become as familiar as those of the 'Iliad' and the 'Aeneid', yet the narrative vitality of the poem persists, in spite of weak drama and weaker characterization. The story is summarized by Hawthorne in his 'American Notebooks': "H.L.C. heard from a French Canadian a story of a young couple in Acadie. On their marriage day all the men of the Province were summoned in the church to hear a proclamation. When assembled, they were all seized and shipped off to be distributed through New England—among them the new bridegroom. His bride set off in search of him—wandered about New England all her lifetime, and at last when she was old, she found her bridegroom on his deathbed. The shock was so great that it killed her likewise." Hawthorne, who could not use the story, passed it on to Longfellow, whose version is substantially the same, except that Evangeline's wanderings take her to Louisiana, to the western wilderness, and, in her old age, to Philadelphia where she finds her dying Gabriel. The most dramatic part of the story concerns her wanderings in the West, where time after time she just misses her love by a day's march. The weakest part is the conclusion, where the climax is deadened by a somewhat sentimental rhetoric. The natural descriptions throughout are magnificent and contribute a good share to the emotional success of the poem. For it is a success. It overcomes its weakness by a cumulative and sincere emotional quality which cannot fail to sway even the most modern reader.

The poem is written in English hexameters, a form which the English poets Kingsley and Clough also used. Longfellow, who was enthusiastic in his praise of this meter, employed it also in 'The Courtship of Miles Standish'. Though interesting, it is weaker and more inclined to monotony than the classic hexameter, which has a marching rhythm, whereas the hexameter used by Longfellow is a waltz measure.

Hiawatha. Schoolcraft's "great book on the Indians" and a few meetings with an Ojibway chief provided the background for a work Longfellow had long been contemplating—a compilation of Indian legends. 'Hiawatha' is a long poem in 22 sections. The first tells the story of the Peace Pipe, how Gitche Manito, the Great Spirit, commands his people to live at peace with each other. Then follows the story of Hiawatha's birth, of his mother Wenonah, and of her death when she is deserted by his father, the West Wind. Brought up by his grandmother Nokomis, Hiawatha becomes a mighty hunter. Then he sets off to the kingdom of the West Wind to avenge his mother's death. Father and son engage in mighty combat, and the father, pleased with his son's prowess, promises to share his kingdom with him. We have then a series of legends: of Hiawatha's love for Minnehaha; how maize came into being; how Hiawatha taught his people the arts of sailing and fishing and writing and freed them from the monster Pau-puk-koewis. The poem ends with the arrival of the white men, the preaching of the Apostle to the Indians, and Hiawatha's death.

The stories are loosely strung together, with Hiawatha himself serving as the connecting link. Although there are majestic passages—notably sections XII, 'The Son of the Evening Star' and XV, 'Hiawatha's Lamentation'—and many fine bits of natural description, the poem as a whole needs pruning. There are too many repetitions, too many catalogs. We do not find in the work that fastidious selection of detail which characterizes the highest art. It is as if the poet were hypnotized with his subject matter and with the monotonous rhythm of the verse and did not know when to stop. The meter, derived from that of the Finnish epic 'Kalevala', is unrhymed, four-stress trochaic verse, and gives somewhat the effect of a recurrent drumbeat. It is the rhythm of a primitive people, and to a modern ear may become unendurably monotonous.

THE LARGEST AND RICHEST ISLAND IN THE UNITED STATES



Long Island is shaped like a fish, with its head in New York City and its forked tail, composed of two long peninsulas, toward the east. The state boundary line shows that all the islands beyond Long Island belong to New York State, except Block Island, which is part of Rhode Island. Long Island Sound forms a sheltered waterway for craft plying between New York and Providence and Boston.

LONG ISLAND. The largest and wealthiest island in the United States, Long Island, belongs to the state of New York. Its great metropolis, Brooklyn, is part of New York City. The island extends from Fort Hamilton on the Hudson River about 118 miles northeast along the Connecticut coast, from which it is separated by Long Island Sound. It is from 15 to 23 miles wide and has an area of 1,373 square miles.

Long Island is a region of marked contrasts. It is modern and it is old. It is rich and it is poor. It has crowded industrial districts and little fishing villages, magnificent estates of the wealthy and thriving market gardens that pour millions of dollars' worth of vegetables into New York City each year. It is also a great playground with miles of shining beaches.

Until about a century ago, the people lived by fishing, seafaring, and raising cattle, except at the west end, which shared New York City's interests. Sag Harbor and the towns called "The Hamptons" were whaling ports; Blue Point was an oyster center before 1800, with a bed near by in Great South Bay. This industry spread to other bays after 1855, when New York State started leasing underwater areas for oyster farms (see Oyster). The building of ships and boats was among the earliest industries.

In 1844 a railroad from Brooklyn to Greenport transformed the island. The western counties, Kings (co-extensive with Brooklyn) and Queens, were absorbed into New York City and became a great industrial center (see Brooklyn). They are joined to Manhattan Island by bridges and tunnels. Nassau County became largely a region of suburban homes, and Suffolk County became noted for its summer resorts and truck farms.

The island was formed in the Ice Age, when the glacier that covered New England pushed a moraine into the ocean, to rest on an underwater rocky ridge (see Ice Age). When the ice melted, the island remained.

The tides and prevailing currents moved sand from the east end to form long spits along the south shore with bays and lagoons inside. The countryside appears flat everywhere except on the gentle "backbone," along the middle; the highest point, High Hill, near Northport, rises only 408 feet above the sea. The north side is wooded but ocean winds and sand blown from the spits hamper the growth of trees in the south. Beauty spots are preserved in 14 state parks, and highways have been built throughout the island. Population (1940 census), 4,600,022.

The Peaceful History of Long Island

The early inhabitants were tribes of Delaware Indians, whose names still remain in many geographic features of the region. Verrazano saw the island in 1524 and Henry Hudson landed on it in 1609. Five years later Adrien Block explored the north shore. The Dutch named the island and claimed all of it, although settlers from Connecticut occupied the east half. It became part of New York when the English captured New Amsterdam in 1664.

The most important historical event in the history of the island was the battle of Long Island fought Aug. 27, 1776, on Brooklyn Heights, which had been fortified by the Americans as part of the defense of New York. The British under Howe, on their way from Jamaica Bay to occupy New York, outflanked the Colonials and drove them from the field.

LONGITUDE. To avoid confusing latitude and longitude, simply remember that *longitude* (from the Latin *longus*, meaning long) is measured on the *longer* dimension of the earth, namely east and west (see Latitude and Longitude). The length of a degree of longitude varies from 69.17 statute miles at the equator to zero at the poles. The following table shows the length of a degree of longitude at every fifth parallel of latitude:

Lat.	Miles	Lat.	Miles	Lat.	Miles	Lat.	Miles
0	69.17	25	62.73	50	44.55	75	17.96
5	68.91	30	59.96	55	39.77	80	12.05
10	68.13	35	56.73	60	34.67	85	6.05
15	66.83	40	53.06	65	29.32	90	0.00
20	65.03	45	49.00	70	23.73		

LOON. "As crazy as a loon" is a significant expression to anyone who has heard the uncanny laughter-like notes which the common loon sends ringing across the waters of North American inland lakes. This bird and three other species make up the family *Gaviidae*.

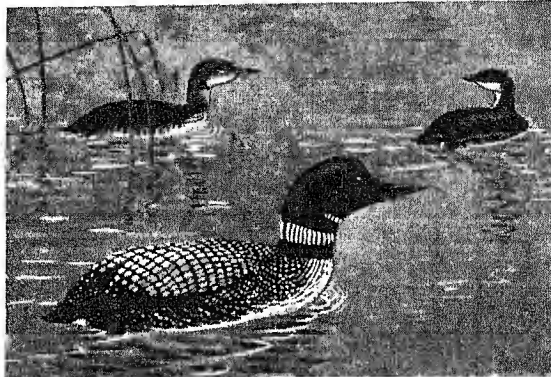
During the nesting season they inhabit freshwater lakes and ponds, but in winter they cruise the seas and large lakes, often living 50 or more miles from land. Because their webbed feet are set far back on the body, they are clumsy creatures on land, wobbling along with the assistance of their wings and bill. Although they have some difficulty in rising from the water, they are strong fliers. Fishes, frogs, and aquatic insects form their chief food. Their nests, with two brown eggs, are usually roughly fashioned near the water. The parents are remarkably affectionate, swimming about in company with their young, and carrying them on their backs when they grow tired.

The common loon is about 32 inches in length. In summer its plumage is a beautiful black spotted and

barred with white, shading to pure white beneath. In winter the upper parts are blackish without white spots. It breeds from Labrador, Newfoundland, Nova Scotia, and Maine south to northern Illinois, and winters from the Great Lakes south to Florida and the Gulf coast.

The red-throated loon, a smaller species about 25 inches in length, visits the United States only during the winter, when it frequents both the Atlantic and Pacific coasts. The plumage of the back, wings, and tail is a dusky brown slightly spotted with white. Its name is derived from its chestnut-colored foreneck. The Pacific loon has black upper parts with a band of white streaks on the throat. This

MOTHER LOON AND HER LITTLE ONES



Young loons are precocious babies. Almost as soon as they step from the shell they are ready for a swim. This is the common loon with her children. Although they are half-grown she keeps them with her, for loons are a great family people.

species is found in the United States mainly in winter, when it ranges along the Pacific coast from southern Alaska to southern Lower California.

The loons form the order *Gaviformes*, or birds of diving type. Scientific name of common loon, *Gavia immer*; of Pacific loon, *Gavia arctica pacifica*; of red-throated loon, *Gavia stellata*. Some classifications use the generic name *Colymbus*, of the grebes, for loons.

The CITY MADE GREAT by both CHARM and INDUSTRY

LOS ANGELES, CALIF. Farmers in Iowa and Wisconsin, shovelling through snow drifts to their mailboxes, find post-cards with pictures of rose-covered bungalows sent by former neighbors newly moved to Los Angeles. Wistfully they read of giant tomato and geranium plants growing in city lots, and of balmy drives in January through a land of orange groves, palms, sunshine, and snowy peaks. Small wonder, then, that thousands of farmers and northern city folk have fled from slush and cold and migrated to Los Angeles to live on their savings, or to find new jobs. At the same time, pretty girls and ambitious boys, young writers and musicians flock to their dream city to try to get into the movies.

The rise of Los Angeles to fifth place among United States cities has been spectacular. Its population, only 11,183 in 1880, had grown to more than 100,000 by 1900. By the end of the next 20 years it had reached 576,673, and by 1940 had jumped to 1,504,277. This remarkably rapid expansion indicates that the majority of its residents have come from elsewhere. Besides the steady stream of people who come from far and near to make their homes in Los Angeles, the city entertains a vast number of visitors. Around it is a rim of smaller cities that have shared its growth. The largest are Long Beach (see Long Beach), Glendale, Pasadena, and Santa Monica. Los Angeles

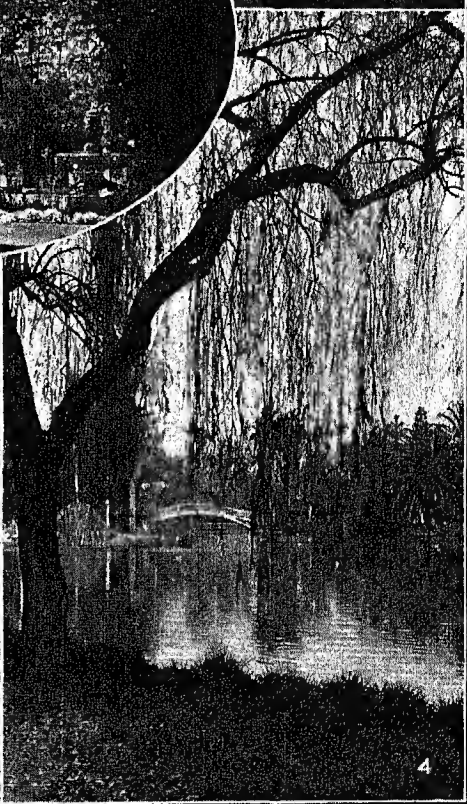
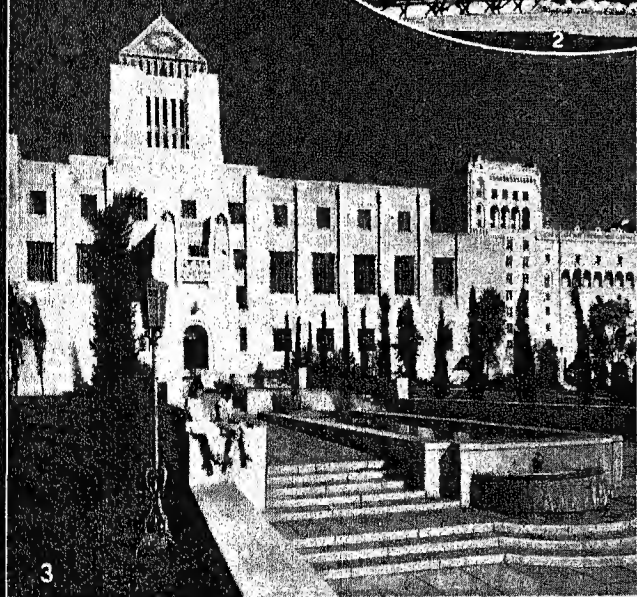
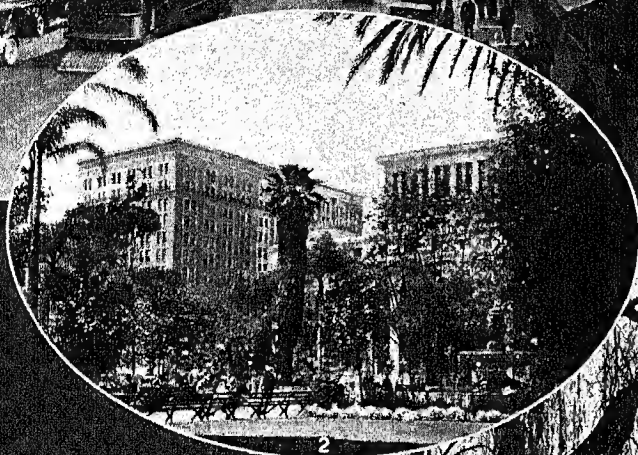
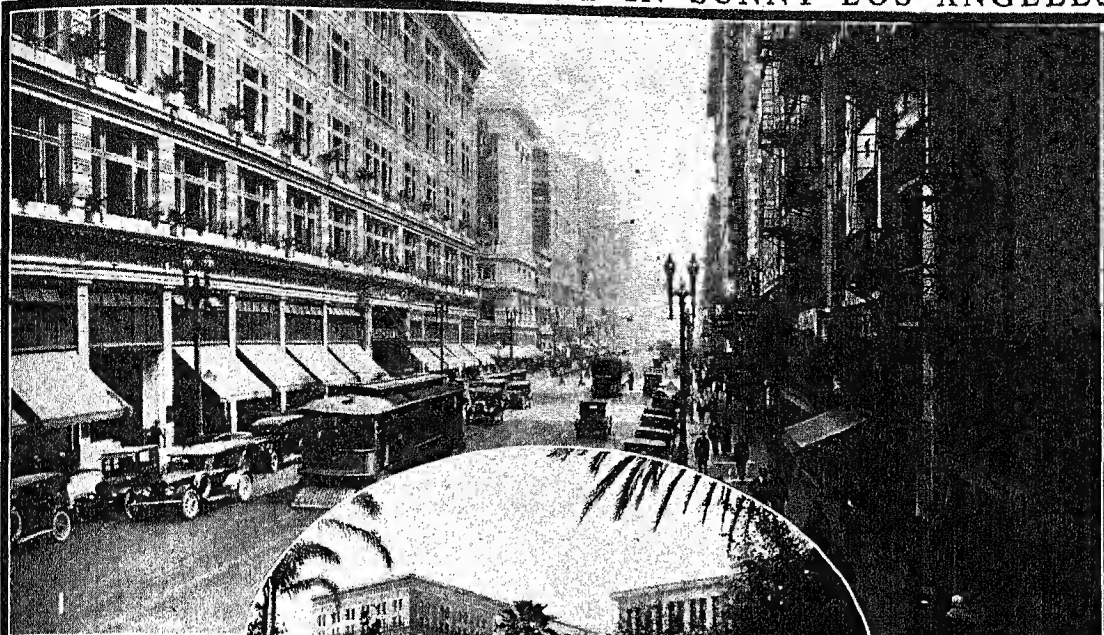
has a larger area than any other city in the United States, 451 square miles. There is room for each inhabitant to raise his own fruits and vegetables!

Why Los Angeles Grew So Fast

Los Angeles has always had its soft climate. Why, then, did people begin to hurry there so suddenly only in recent years? To begin with, not until recent decades did many Mid-Westerners become rich enough to retire and live where they chose. The pioneers had to work for food and shelter all their lives. But once in southern California, these "retired" newcomers found it impossible to remain idle; their brains and bodies would not permit it.

They knew that a city cannot attract a million inhabitants just because it has a glorious climate. Cities need factories, but factories are not interested in a city just because it happens to be beautifully situated in the foothills of the Sierra Madre Mountains. Factories need power, and where was southern California, without coal, to get power? It got power by drilling wells for oil and natural gas, and by harnessing mountain streams to make electricity. Because oil, hydroelectricity, and gas are such clean fuels, Los Angeles is a clean city, even though it is the chief industrial community west of the Mississippi River. It is a tire center, and it turns out printed matter, automobiles, meat, lumber, petroleum, foundry and

BUSTLE AND BEAUTY MINGLE IN SUNNY LOS ANGELES



Los Angeles—the home of retired millionaires and movie stars. Set in a natural amphitheater formed by the foothills of the Sierra Madres, the southern California metropolis, with its golden sunshine and its semi-tropical verdure, presents a myriad of charming vistas. Here the fusion of American and Spanish influences is seen in the architecture not only of the business section but of the far-flung suburbs. This new “wonder

city” is the capital as well of the movie industry as of the petroleum products and fruit canning and other more prosaic industries. The magnet of ambitious screen stars, it is the graveyard also of uncounted hopes. A sightseeing whirl through Los Angeles would include many show places, only a few of which can be presented on this page. (1) Broadway at 8th Street, the shoppers’ favorite place. With the exception of her city hall,

the city of the angels permits no skyscrapers, but preserves a uniformity of skyline reminiscent of the old-world capitals. Pershing Square (2) is a palm-fringed oasis in the heart of the commercial district. The severe modern lines of the Public Library (3) are relieved by strongly cut sculptures, by bright tiles in the tower, and by landscaping with pools and rows of cypresses. A weeping willow is mirrored (4) in the Echo Park lagoon.

machine products, airplanes, clothing, baked, canned, and preserved foods, furniture, coffee, spices, and flour—all without marring the city with the smoke and grime of myriad factory chimneys.

But factories cannot grow without transportation, so Los Angeles, 20 miles inland, decided to have a harbor. It annexed the seaside towns of San Pedro and Wilmington, and between 1910 and 1914, with the aid of the Federal government, built a harbor. A great breakwater has turned what was formerly an unprotected roadstead into a roomy outer harbor, and the dredging of channels and slips through an expanse of mud flats has made an inner harbor with miles of waterfront and hundreds of acres of reclaimed land on which stand terminals, warehouses, and shipyards. The harbor is from two to ten days nearer the Atlantic seaboard and European and South American ports, by water through the Panama Canal, than are the more northerly Pacific ports.

Los Angeles harbor is one of the greatest in the world. Direct steamship service links it with all the ports of the world. It has an annual commerce worth hundreds of millions of dollars in incoming lumber, rubber, silk, and coffee, and outgoing oil and other minerals, fish and other foodstuffs, and factory goods. The harbor is physically one with that of Long Beach, but the civic pride of the respective cities keeps each under separate control.

Superb Roads of the Region

Several transcontinental railroads, air lines, and bus lines join Los Angeles with the east. Where there are two automobiles to every five people, the highways must be superb, and smooth roads lead for hundreds of miles into the surrounding country, through perfumed orange groves and over rocky heights, making the region a paradise for motorists. There are also excellent local and interurban railways.

Factories need raw materials, too, and the rich agricultural land around Los Angeles provides these. It gives them fruits, vegetables, cotton, grains, live stock, dairy products, poultry, and minerals as well.

LOS ANGELES' DOMINANT NOTE, THE CITY HALL



Towering high above the surrounding buildings, Los Angeles' 28-story city hall serves as a landmark for aviators by day and night. This majestic building, occupying an entire block, is illuminated by floodlights at night, and the beam from the Lindbergh beacon at its apex, 440 feet above street level, describes a circle with a radius of 100 miles. The city hall is an outstanding example of the "set-back" type of architecture.

What materials it cannot supply, it brings by water and rail—rubber from Singapore, lumber from the more northerly coast.

A great city must have water, so Los Angeles went 240 miles into the Sierra range near Mt. Whitney and brought back a whole river for city and irrigation purposes.

Motion Pictures

The moving pictures came to Los Angeles when these great developments had just begun, and they are still its greatest industry. Los Angeles is the motion-picture center of the world.

Balmy climate,

almost perpetual sunshine, and varied scenery are just what "movie" directors and companies need. Here are staged a large proportion of the world's film plays—from "slapstick" comedies to dramatizations of literary masterpieces, and with settings ranging from the South African *veld* to the frozen glaciers of the Far North (see Motion Pictures). Player folk are everywhere—from high-salaried stars in limousines to hordes of "extras" on foot. Scenes are taken all over town, and until the advent of talking pictures made closer control of all sound imperative, residents were never surprised to see wild adventures staged before their very doors. The industry centers in Hollywood, a former suburb annexed in 1910.

Mingled Modern and Spanish Architecture

Los Angeles, modern from tip to toe, favors severe modern architecture. The towering City Hall is a fine example of "set-back" construction, and the Public Library is squarely set along Egyptian lines. Yet the city clings, too, to gentler Spanish buildings with languorous patios, stucco walls, and tiled roofs, homes with riotous gardens and settings of dark fir, eucalyptus, rocketing palms, and plummy pepper trees.

Young people in Los Angeles have every educational advantage. After high school, boarding school, or military academy, they may study at a section of the University of California, at the University of Southern California, at Occidental College, Loyola University, Southwestern University, or at California Institute of Technology at Pasadena. Young and not so young attend night schools. The enormous congregations in

Los Angeles have built as many as 50 new churches during the course of a single year.

Los Angeles people have many places to go to for recreation. Crossing to Santa Catalina Island, a mountain in the sea 25 miles out from Los Angeles harbor, one can see strange submarine gardens through glass-bottomed boats, or watch seal families on the rocks. Sportsmen come here to angle for game fish. This island is about 25 miles long and averages 4 miles in width. Its hills and gorges are covered with beautiful vegetation. Saber-toothed tigers and giant wolves, trapped ages ago in the asphalt pits at Rancho La Brea in Los Angeles, have left their bones for us to see in the Los Angeles Museum of History, Science, and Art. Lovers of the arts delight in the rare manuscripts and paintings of the Huntington Library and Art Gallery near Pasadena, which is a close neighbor of Los Angeles. Most of us have heard radio broadcasts of football games played in Pasadena's Rose Bowl. Symphony concerts and grand opera are heard under the stars in Hollywood Bowl. Near Los Angeles are the old San Fernando and San Gabriel missions, and the world's largest reflecting telescopes in the Mount Wilson and Mount Palomar observatories (see Observatory).

Grand opera is presented at the Shrine Civic Auditorium which has a seating capacity of 6,500. A modern building of monolithic concrete houses the public library. Griffith Park is set among the foothills in 3,761 acres of natural landscape. Among its features are an observatory with a planetarium and a hall of physical science under one roof, and a fine golf course.

A Sleepy Pueblo and a War

Los Angeles was founded in 1781 when 11 Mexican families, two priests, and some soldiers settled a sleepy Spanish pueblo named for a saint's day—*El Pueblo de Nuestra Señora la Reina de Los Angeles* (The Town of Our Lady Queen of the Angels). Royal messengers brought mail once a month to the adobe houses around the plaza.

Under Mexican rule, after 1821, Los Angeles was now and again capital of California. Commodore Robert F. Stockton and Gen. John C. Frémont raised the American flag over the town in 1846 during the Mexican war. The people revolted, but Stockton and Gen. Philip Kearny took the village again in 1847. The hamlet got its city charter in 1850.

Adventurers from the San Francisco gold rush moved south to Los Angeles and made it a lawless cow town. The Southern Pacific planned to leave Los Angeles off its track entirely in the middle 70's, and

went in only after the eager citizens had made valuable concessions to the transcontinental road. The Southern Pacific and the Santa Fe, which arrived soon after, had a rate war in the later 80's and cut the round-trip fare from St. Louis and Chicago to Los Angeles to \$15. Tourists swamped Los Angeles. A wild land boom soared, then collapsed flatly, but that boom began the phenomenal modern history of the city.

The city is governed by a mayor, city council, and commissions appointed by the mayor. City laws provide for the initiative, referendum, and recall, and for control of finances by an executive budget.

LOTUS. In the *Odyssey*, Homer tells us that the magical lotus fruit caused those who ate it to forget country, friends, and home. The expression "lotus-eaters" has therefore come to mean dreamy indolent persons who have lost contact with reality. We usually associate the word with the blue Egyptian lotus, or the sacred pink lotus of the Chinese, Japanese, and Hindus. To the ancient Greeks the lotus probably meant a prickly shrub (*Zizyphus lotus*) with a sweet mealy fruit, which is still eaten in some Mediterranean districts.

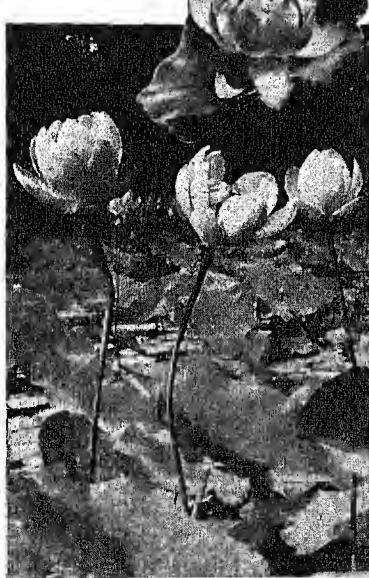
The American lotus (also called the yellow water lily, water chinquapin, or nelumbo) is a magnificent water lily found locally from southern Ontario to Texas and Louisiana. It is especially abundant in the Mississippi and Missouri rivers, and at Grass Lake, in northern Illinois. The plants form a dense tangle of giant circular leaves up to 30 inches across, raised on strong stems two to six feet above the water. The flowers, which open in August, are a pale sulphur-yellow; they measure 4 to 10 inches from tip to tip of the outspread petals. The Indians were fond of the edible rootstocks and seeds. Perhaps the wide distribution of the plant may be due to Indian traders who carried the seeds through the country.

In art and architecture the lotus, in conventionalized designs, is a common ornament. This design

originated in Egypt, where it was used on the capitals of columns, and in India and China, but frequently appears in modern European and American art.

The lotuses belong to the water-lily family *Nymphaeaceae*. The American lotus (*Nelumbo lutea*) is closely related to the pink East Indian lotus (*Nelumbo nucifera*). The Egyptian lotus of the Nile River belongs to a related genus *Nymphaea*. *Nymphaea lotus* has white or rose petals; *Nymphaea caerulea* has blue petals. The Egyptian and the East Indian plants have both been naturalized in the United States. Lotus is also the name of a genus of the pea family (*Leguminosae*), of which the bird's-foot trefoil, *Lotus corniculatus*, a small perennial herb, is the most widespread.

THE AMERICAN LOTUS



The American lotus, or nelumbo, spreads a luxuriant carpet of glossy-green leaves and large yellow blossoms over ponds and lakes of the eastern United States. Like the sacred lotus, it is a water lily.

LOUIS—A ROYAL NAME in France for 13 CENTURIES

The Story of a Long Line of Rulers, Good and Bad—Louis the Fat, Who was Great as a Fighter, a Hunter, and an Eater; a Saintly King, and a Crafty One; the "Grand Monarch"; the Weak Louis Who Lost His Head, and Many Others

LOUIS, KINGS OF FRANCE. CLOVIS (or Chlodowech), the founder of the kingdom of the Franks, 481-511, may be considered the first of the numerous French kings to bear the name of Louis. In after years the "C" was dropped, and the "v" was written as a "u," thus making our modern name of Louis. It is the same as the English Lewis and German Ludwig. But the Louis who is usually reckoned as Louis I of France was the son of Charlemagne and followed his father as king and emperor. He is called **LOUIS THE PIOUS** and ruled from 814 to 840. The next four kings of this name in the Carolingian line left too little mark on the course of history to deserve mention here.

Louis VI, "the Fat," 1108-1137, was the first important king of the Capetian line. This line sprang from Hugh Capet, who became king in 987. Louis the Fat was a great fighter, a great hunter, and a great eater, and at 46 he became too fat to mount a horse. But he remained the embodiment of warlike energy. His great task was to reduce to order the petty nobles of the royal domain, who were truly "robber barons." When Louis came to the throne every lord of a castle robbed at will, and it was not safe for even the king to pass along the road. Twenty years of hard fighting were necessary to remedy this condition, but in the end the king triumphed, and law and order prevailed. In order that such evils might not recur, every castle that was captured was destroyed or given to faithful followers.

Louis VII, 1137-1180, son of Louis VI, is remembered for two events. He led the fruitless Second Crusade (1147-49) and he caused the annulment of his marriage to Eleanor of Aquitaine. Eleanor then

married Henry II of England. Thus the duchy of Aquitaine in southern France, the dowry of Queen Eleanor, passed from the possession of the king of France to his rival, the king of England. Louis VIII, 1223-26, the son of Philip Augustus, reigned too short a time to accomplish anything of great importance.

Louis IX, 1226-1270, called "Saint Louis," is perhaps the most heroic and popular one in the whole procession of French monarchs.

He was the dutiful son of Louis VIII and his queen, Blanche of Castile, and in his education the rod had not been spared; his widowed mother often told him that she would rather see him dead than have him commit a

mortal sin. She herself was a remarkable woman, who during her son's minority dauntlessly faced the numerous revolts of the turbulent nobles. In her son she was fortunate, for he possessed all the good qualities and few of the bad ones of the age in which he lived; indeed, his virtues were so remarkable that after his death the church declared him a saint. His acts of piety, however, such as wearing a hair-cloth shirt, fasting, and waiting on lepers, were usually performed in private. To the world he was a fearless knight, thoroughly trained in the art of war; a conscientious, just, and able king, who was usually good-

LOUIS "THE SAINT" HONORED BY HIS FOES



A king whose religion was his life, it is not surprising that Louis IX should have been one of the leaders in the Crusades. Captured by the Saracens in 1250, he was released after paying a heavy ransom. During his captivity, however, he won the admiration of his enemies by his dignity and honorable conduct. Here we see the Saracen chiefs paying homage to him at the door of his prison tent. But this tribute to his character was all that his effort finally won, for the Crusade was an utter failure.

humored and kindly, but at times became impatient and angry; and a powerful ruler, who greatly strengthened the royal power. He improved the government by appointing local officials who were responsible to him for the administration of justice, the collection of taxes, and the government of their districts. He encouraged the people to appeal to him if the nobles oppressed them or his officials were unjust. He also improved the administration of justice by abolishing trials by combat and by using in his courts the new lawyers trained in the Roman law, in place of the churchmen who, formerly, alone could read and write. These reforms not only benefited the people but they checked the power of the quarrelsome nobles, who, according to a writer of the time, "undertook nothing against their king, seeing clearly that the hand of the Lord was with him." Saint Louis made two crusades—one to Egypt and the Holy Land (1248-54), on which he was captured and held to ransom by the Mohammedans; and the other to Tunis, in 1270, where he died of the plague.

under the direct control of the king. The power of the crown in the latter part of his reign was truly absolute over the territory it held.

Louis XII, 1498-1515, is chiefly noted for the Italian wars, begun by his predecessor Charles VIII, and continued after Louis XII by Francis I.

WHAT A DISPOSITION!



An awkward, bony, ungainly creature with a long thin nose, Louis XI had a disposition as ugly as his looks. Thoroughly cynical and unscrupulous, he hesitated at no breach of honor to gain his ends. Around his shabby old hat he always wore lead images of saints, for he was pious—in his way.

Louis X ruled for but two short years, 1314-1316.

Louis XI, 1461-1483, presents a striking contrast in character to Louis IX. In appearance Louis XI was "ugly and unkingly"; in character he was unscrupulous and underhanded—a man of the Renaissance, and like his contemporaries, Caesar Borgia and Richard III, an embodiment of the principle which we call Machiavellian. He firmly believed that "he who has success has honor," and he cared nothing for the way in which he attained the success. He made promises only to break them, unless he had sworn by one particular saint—then his word was good. His one ambition seemed to be to extend the boundaries of France, and although he was too stingy to buy a new hat to replace the shabby old one he wore, he spent large sums in buying back border cities. In his conflicts with the nobles, especially with Duke Charles the Bold of Burgundy, he also acquired much territory, so that by the time of his death most of the land of France had been brought

his brilliant court at Versailles became the model and the despair of other less rich and powerful princes, who accepted his theory of absolute monarchy (*L'état c'est moi*, "I am the state") and would gladly have imitated Louis XIV's luxury. Until 1661 the government was largely in the hands of the wily Italian, Cardinal Mazarin. But at his death Louis declared that he would be his own prime minister, and from then until the end of his reign he worked faithfully at "his trade of a king."

A passion for fame and the desire to increase French territory in Europe were the leading motives of Louis XIV. The latter led him to neglect the opportunities to gain an empire in America and India, and involved him in a series of wars which ruined the country financially and paved the way for the outbreak of the French Revolution.

His first war (1667-68) was an attempt to enforce flimsy claims to part of the Spanish Netherlands (Belgium). His second (1672-78) was directed against

Louis XIII, 1610-1643, has his chief claim to greatness in the fact that, in spite of all opposition, for 18 years he kept in power his able minister, Richelieu (*see* Richelieu, Cardinal). The first years of the reign were filled with anarchy and disorder, for the king was a child, and his mother, who ruled for him, was a weak and selfish woman. When Richelieu came into power, however, all this was changed. The Huguenots (*see* Huguenots) were reduced to a mere religious body, and the nobles were humbled. National unity and religious peace were secured at home, and the country was raised to the first position among the powers of Europe.

Louis XIV, 1643-1715, inherited this power, and carried it to yet further lengths. He was styled "the Grand Monarch," and

"their High Mightinesses," the States-General of Holland, who had balked him of his prey in the first contest. In spite of the great military power of France, the Dutch admiral De Ruyter twice defeated the fleets of the French and their English allies, and Louis XIV failed ingloriously in his attempt to conquer Holland. The third war also (1689-97) was directed chiefly against Holland, whose "Stadholder" had now become King William III of England. The German province of the Palatinate was terribly wasted, but the Peace of Ryswick brought only slight gains for France. Louis' last and greatest effort was the War of the Spanish Succession (1701-13) in which the English Duke of Marlborough (see Marlborough, First Duke of) was the chief leader of the opposing European coalition. The right to seat his grandson Philip V on the diminished throne of Spain was small compensation for the thousands of lives and millions of treasure which the French king wasted in the struggle.

Millions more were spent by Louis in building the beautiful palace at Versailles, near Paris, and in maintaining his brilliant court. There etiquette "became the real constitution of France." It required seven persons, some of them the highest princes of the realm, to put the king's shirt on him at his getting up (*levée*) in the morning. A French historian says of Louis XIV: "He was a god in his temple, celebrating his own worship in the midst of his host of priests and faithful." This extravagance of the court meant a heavy burden of taxation for the common people, who were thereby reduced to a misery so great that three-quarters of a century later they rose up in rebellion and drove the Bourbons from the throne.

Louis XIV has the distinction of ruling longer than any other European king; for it was 73 years from the time when he ascended the throne as a child of less than five, until his death in 1715. He had outlived his son and his son, so that he was succeeded by his great-grandson.

Louis XV, 1715-1774. The luxury of the court of Louis XIV was continued under his weak successor,

who came to the throne at the age of five years. The evils from which the country suffered were clearly recognized, but the king when he grew up was too lazy and selfish to try to remedy them. Misgovernment was common at home, and the position of the country abroad was lowered by the loss of her colonial

possessions in India and America. His Second fortunes, however, of little impression on then king or his country whose attitude was expressed in the phrase, "After us the deluge."

Louis XVI, 1774-1792. The storm broke in the reign of the just but irresolute Louis XVI. Awkward and timid, no man could have appeared less like a king than did Louis XVI, who was 20 years old when he came to the throne; and none could have seemed more out of place in the brilliant and polished court of which he was the center. Louis realized this himself, and often wished, even before the Revolution, that he were only a common man. He was a good horseman, fond of hunting, and delighted in making and mending locks. His greatest fault was that he was always ready to listen to and

follow the advice of others. When this advice was good all went well; but in the latter part of Louis' reign the advice was bad and it cost the king his life.

When he first came to the throne he entrusted the management of the finances of the kingdom to Turgot, one of the greatest of statesmen, and as long as the king followed his minister's advice, the state of the kingdom was improved. But he was more often under the influence of the beautiful but frivolous and extravagant queen, Marie Antoinette, and of the selfish courtiers. These all opposed any financial reforms which would threaten their "gratuitous" pensions and life of ease, and they soon persuaded the king to dismiss his able minister.

The Beginning of the Great Revolution

From this time on things went from bad to worse, and finally Louis XVI was forced to call the Estates-General, a body which had not met since 1614. Its meeting was the first step in the French Revolution (see French Revolution). The members of the third

THE "GRAND MONARCH" OF FRANCE



A magnificent creature, to be sure, this Louis XIV, the "Grand Monarch" in all the pomp of his royal robes! But the common people of France had to pay for all his magnificence in frightful burdens of taxation. And three-quarters of a century later another Louis paid with his life for the follies of his luxury-loving ancestors.

estate refused to follow the old method of voting, and finally declared themselves a national assembly.

At first the king seemed inclined to work with the Revolution and try to remedy conditions in the country. But the influence of the queen and of the courtiers proved too strong for his feeble will. Encouraged by them, he disregarded the promises he had made, and sought to flee from France that he might obtain aid against the revolution from Austria.

This attempted flight was the beginning of the end. The people saw that they could not trust the king and the "Austrian woman," as they called the queen. His disregard of his promises to abide by the constitution led to the storming of the royal palace of the Tuileries on Aug. 10, 1792. The king and his family escaped before the mob arrived and took refuge in the hall of the Legislative Assembly. That body declared the king was suspended from office and ordered that he and his family should be imprisoned. They then called a new assembly (the Convention) to decide whether France should continue to be a monarchy.

The convention first decided against a monarchy, and declared the king deposed. They then brought Louis XVI to trial on the charge of combining with foreign countries for the invasion of France. Almost unanimously Louis Capet, as he was now called, was declared guilty and was sentenced to death. The next day he was beheaded, meeting his fate with a steadfast courage, and proving greater in death than he had ever been in life. His son, the little Dauphin, who soon perished mysteriously in prison, is counted as Louis XVII, although he never ruled. The execution of Louis XVI had important consequences for France, for it aroused opinion in other countries against the French Revolution.

Louis XVIII, 1814-1824. When the Bourbons were restored to the throne of France by the Allies in 1814, the younger brother of Louis XVI assumed the crown as Louis XVIII. The difficult task of reconstruction was before the king, but he seemed

admirably adapted to meet the situation. He was cold-blooded and cared nothing for revenge, therefore he was satisfied to leave alone those who had driven his family from France. He was a lazy man, and his one ambition was to keep his throne. This ambition seemed likely at first to go unfulfilled, for in 1815

Napoleon returned from his island empire of Elba, and Louis XVIII fled in a panic from France. At the end of the Hundred Days, however, Napoleon was again overthrown, at Waterloo, and the Allies entered Paris, "bringing Louis XVIII in their baggage."

Until 1820 the king was able to resist the demands of the extreme royalists for vengeance, and to build up his kingdom, but finally under the leadership of his brother they became too strong for him. His yielding to their demands for a reactionary government marks the beginning of the end of the Bourbons, for 10 years later, under his brother, Charles X, they were driven finally from the throne of France.

LOUIS PHILIPPE, 1830-1848. Having disposed of the Bourbons, the French had to set up a new government. Influenced by Lafayette (see

Lafayette, Marquis de), they decided to keep France a monarchy, with Louis Philippe, a member of a family related to the Bourbons, as king.

Louis Philippe was known for his democratic ideas, and was given the title of the "Citizen-king." He walked the streets of Paris alone, carrying a green umbrella and talking with strangers, and his children were sent to the public schools. But his government was undemocratic, and the people were not better off than before. Only the wealthy had profited by the Revolution of 1830. Demands for a more liberal government were refused by Louis Philippe, and his minister, Guizot.

When finally the government forbade a reform banquet which was to be held on Feb. 22, 1848, the Republicans of Paris revolted. Guizot was forced to resign, but this did not satisfy the rioters, and Louis Philippe abdicated on Feb. 24. Then he fled to England, where he died two years later.

"THE LOST DAUPHIN"



When his father, Louis XVI, was executed, the boy Louis Charles was placed in solitary confinement. Although the authorities claimed that he died there, many royalists believed that the dead child was a substitute, and that the real prince or "dauphin" had been spirited away. Although he never reigned he is known to history as "Louis XVII."

"CHILD of the MISSISSIPPI," Sunny LOUISIANA

LOUISIANA. The child of the Mississippi, Louisiana is built of deposits laid down by the river on the floor of the Gulf of Mexico in ancient days when the gulf extended up to where Cairo, Ill., now stands. But its rich soils are the slightest part of the state's inheritance from the Father of Waters, for it guards the gate of a river valley far vaster in extent and possibilities than any of those on which old-world empires were built. Its port, New Orleans, near the mouth of the Mississippi, looks southward over the "American Mediterranean." Through it passes a large part of the trade between South America and the Mississippi Valley, and it exports a great volume, particularly of cotton, to Europe.

A Network of Waterways

From low plateaus and flat-topped hills, with an elevation of only 300 to 400 feet near the Arkansas line, the land slopes gently southeastward, through "bluffs" and prairies, to the wooded swamps, "quaking prairies," and grassy marshes of the coast. The whole surface is fretted with waterways—rivers and sluggish bayous or secondary river outlets, bays and lakes, some of which are merely land-locked bays or lagoons opening to the Gulf. Much of this is navigable water, except where choked with the water hyacinth and other vegetation; in fact, of the 64 "parishes" (subdivisions) of the state, it is said that only four are without navigable water communication. The rivers have built up their beds until they flow on the summits of low broad ridges; of the alluvial lands on either side, the highest portions are the banks which the streams have built for themselves and often seek to overflow. The Mississippi, a capricious and irascible benefactor, tries every spring to take back the lands which it has created, and hundreds on hundreds of miles of strong levees are required to protect the low-lying plantations and farms against it and against the Red and other large rivers.

A Picturesque Wilderness

Picturesque old cities, brisk thrifty new towns, broad plantations and prosperous little farms, claim only a portion of the land. Along many a remote bayou alligators and snakes still sun themselves peacefully on the knees of the ragged cypress, with its long beard of gray Spanish moss waving above the black water. The marshy coast fringe, once a haven for pirates, smugglers, and other outlaws, is still a fragrant and flowery wilderness of grass, cane, palms, gum trees and live oaks, a refuge for canvasback and other ducks, pelicans (Louisiana is called the "Pelican State"), and cranes. While some marshy lands are being reclaimed for agriculture, Marsh Island and some other wild tracts have been given to the state as a perpetual refuge for wild life.

Extent.—North to south, 245 miles; east to west, 270 miles. Area, 48,523 square miles (of which 3,346 square miles are water). Population (1940 census), 2,363,880.

Natural Features.—Surface low; extreme height in northwest, 469 feet. Principal rivers: Mississippi and its tributaries; Red River, Ouachita, Sabine, Pearl. Lake Pontchartrain largest lake. Mean annual temperature, 67°; mean annual precipitation, 56".

Products.—Corn, rice, cotton, sugar cane; hogs, cattle, poultry and eggs; oysters, fish; lumber; petroleum, natural gas, sulphur, salt; sugar refining, lumber products, cottonseed products, rice milling.

Cities.—New Orleans (494,537), Shreveport (98,167), Baton Rouge (capital, 34,719).

Its wonderfully fertile soils and subtropical climate make Louisiana pre-eminently adapted to agriculture. The chief crops are corn, rice, cotton, and sugar cane. Cotton, long the chief

sale crop, has tended of late to give way to the other staples and to a more diversified agriculture, but it still dominates the region north of Red River.

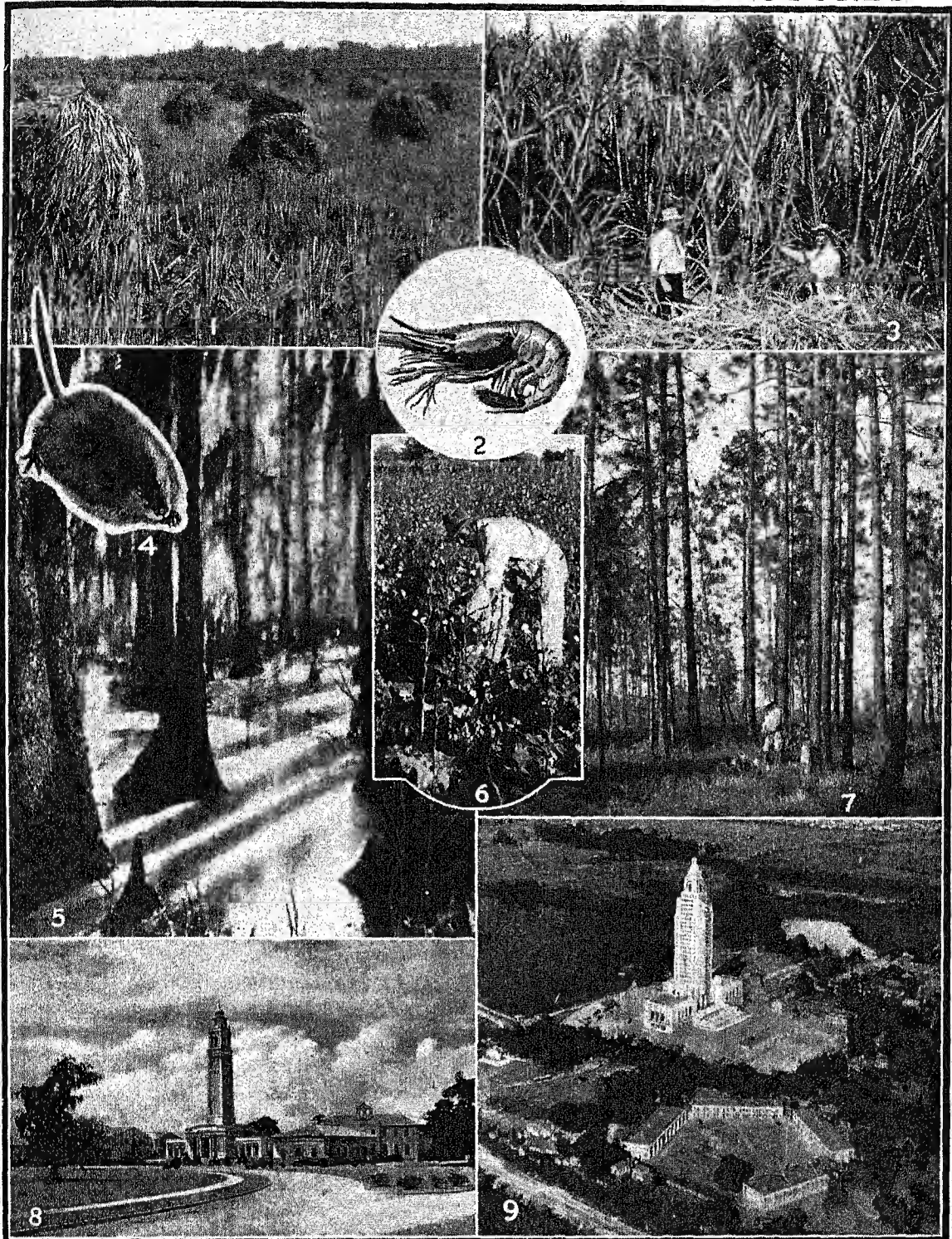
Rice, a crop in which Louisiana leads the Union, is grown on the coast marshes and alluvial prairies in the southwestern part of the state. Until 1897 practically the whole crop was "Providence" rice; that is, rice grown by no other water supply than rainfall. Two years of drouth caused a change in methods, and now rice is grown on what are known as "pump lands" by irrigation with water pumped up from bored wells into channels made by throwing up parallel dikes. Corn can be grown anywhere in the state, and the yield on alluvial and reclaimed marsh lands runs as high as 100 bushels to the acre. Sugar cane, grown both for sugar and for syrup, is the distinctive crop of Louisiana. The state produces more cane sugar than all the other cane-growing states of the Union. Sugar cane for sugar demands rich soil and rather expensive care; it is grown chiefly on large plantations and on alluvial and reclaimed marsh lands in the southern part of the state. Sugar cane for syrup is less exacting; it is grown farther north, on poorer soil, and by small farmers.

Art of Sugar-Making Learned

The man who showed that good sugar could be made from Louisiana cane was the savior of the colony in the 18th century, when its then chief money-making crop, indigo, was attacked by a destructive worm. The Jesuit fathers had introduced sugar cane in 1751, but the only sugar which anyone had succeeded in making from it was wet, brown, and unfit for export. Louisiana planters were faced with ruin when Etienne de Boré put all his means into sugar cane, and in 1794 succeeded in producing pure white crystalline sugar, thereby revolutionizing the agriculture of the colony. In 1927, when the mosaic disease threatened the sugar cane, the industry was saved by importing from Java a cane which is able to resist the disease. The Audubon Sugar School is a feature of the state university at Baton Rouge.

Among the more important minor crops are hay, oats, peanuts, oranges, kumquats, and other subtropical and temperate zone fruits; nuts, especially pecans; Irish and sweet potatoes, the latter of increasing importance since growers have learned to enhance their keeping qualities and market value by drying in "curing houses." Louisiana has been called the "Holland of America," not only because of the importance of its dikes, but because of the prominence

LOUISIANA AND ITS RICHES IN PICTURES



From Louisiana's cane and cotton fields, truck gardens, rice pads, forests, coastal swamps and waters comes the wealth which flows into her cities, taking concrete form in public buildings and educational institutions as the state university at Baton Rouge. Rich in rice, cotton, and early strawberries, her resources also include timber, oil, fish, and fur-bearing animals. (1) Harvest time on a Louisiana rice field. (2) One of the famous Louisiana shrimps, the total catch of which exceeds 100 million pounds a year. (3) A field of sugar cane. (4) Muskrat, or mushquash, whose pelts supply our "Hudson seal." (5) Cypress swamp, to which mysterious beauty is added by draperies of Spanish moss. (6) In the heart of the cotton belt. (7) Second-growth stand of long-leaf pine saplings. (8) Campanile of the state university, located on a campus adjoining the Mississippi River a short distance south of Baton Rouge. The campus was occupied in 1925. (9) Aerial view of the state capitol at Baton Rouge.

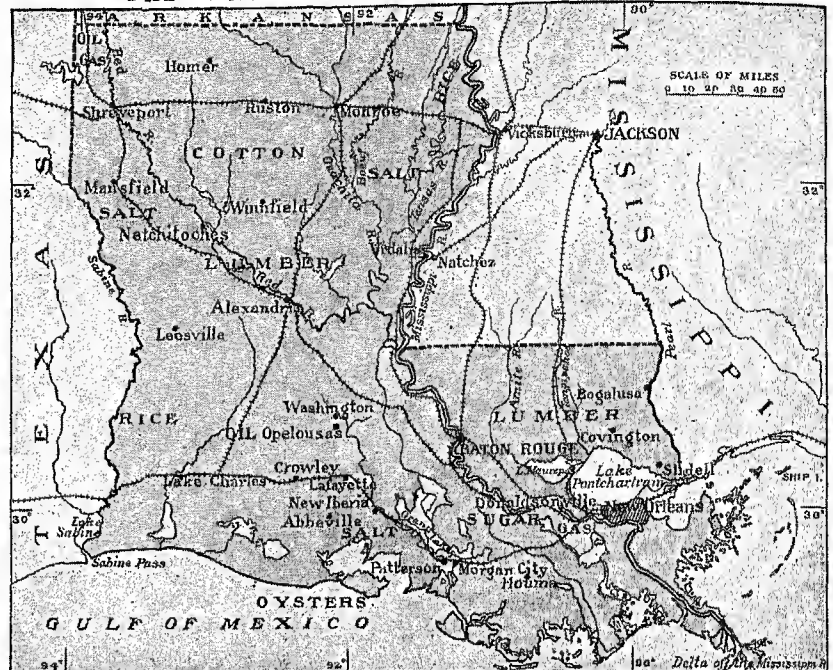
of the trucking industry. "Tangipahoa strawberries," grown in the strip running north from between lakes Maurepas and Pontchartrain, are famous; cabbages are a specialty on the lower Sabine River; tomatoes on the upper Ouachita, around Monroe; and potatoes and cantelopes in the north-western corner of the state. Such crops are grown all the year round, but particularly in winter for the Northern markets. Tobacco is grown to a limited extent. The famous Perique tobacco, used for seasoning fancy blends, is grown on a little tract of a few hundred acres on the banks of the Mississippi southwest of Lake Pontchartrain and nowhere else in the world. Stock-raising and wool-growing, hitherto neglected industries to which soil and climate are admirably adapted, are being pushed as part of the campaign for diversified farming.

With all its advantages for agriculture, much less than half of Louisiana soil is in farms, and only about a quarter is improved. There is a progressive tendency toward subdivision, and the average farm is well under a hundred acres in size. Yet there are still hundreds of plantations of more than a thousand acres each.

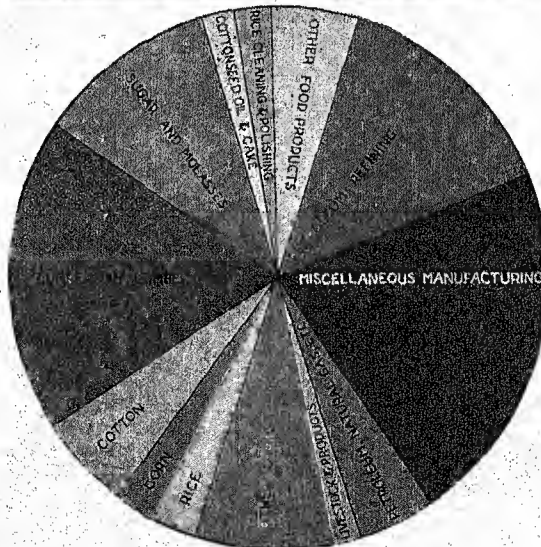
The long-leaf pine forests of the east and southwest, the short-leaf pine of the northwest, the cypress of the alluvial and overflowed lands of the south, and the hardwoods of the river bottoms throughout the state support a vast lumber industry and make Louisiana one of the foremost lumber states east of the Pacific states. Spanish moss is gathered in great quantities for stuffing mattresses, pillows, and upholstery.

Fishswarm in the Louisiana waters. The state produces more shrimps than any other, and its oyster

THE "BAYOU STATE" AND ITS PRODUCTS



The map shows the principal products of the various districts of Louisiana. Below we see the relative numbers of people in the leading occupations, and the comparative value of the agricultural and industrial products.

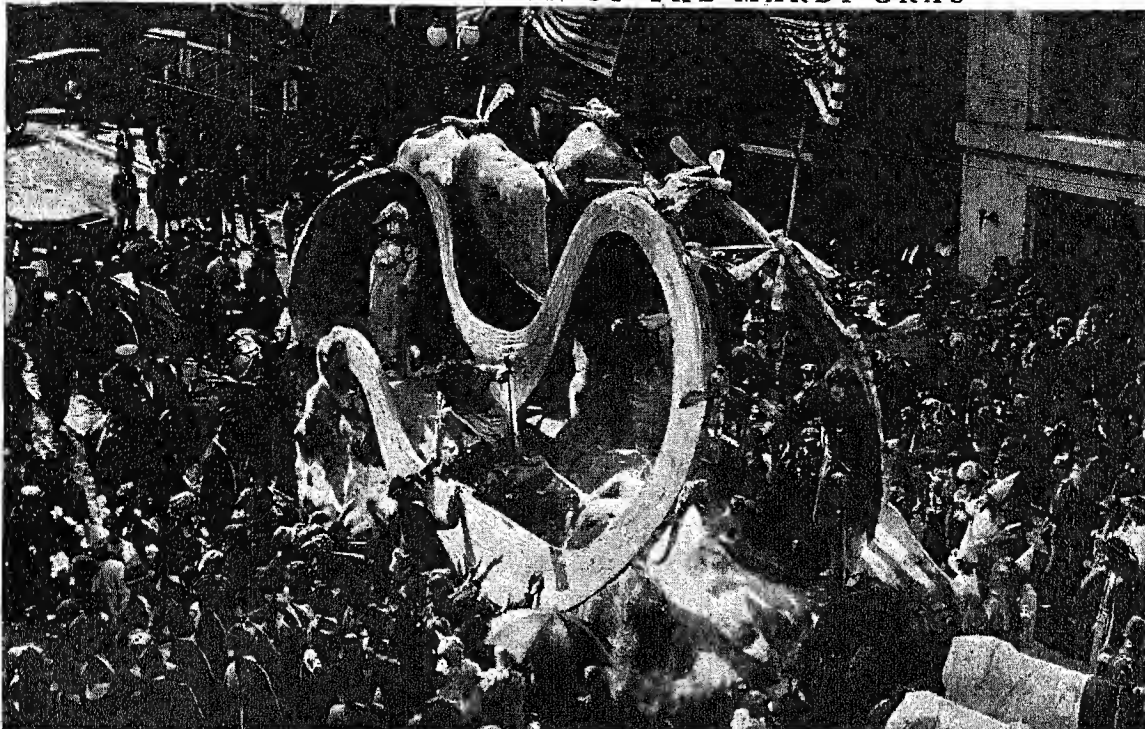


fisheries are second only to those of Chesapeake Bay. The raccoons, opossums, and other fur-bearing animals of the state are of considerable value; they and the birds have been placed under the protection of the State Conservation Commission.

From the southwestern corner of the state near Lake Charles comes much of the sulphur produced in the United States (see Sulphur). Salt of extraordinary purity is mined in great quantities in the "islands" (island-like hills scattered in the marshes) near Vermilion Bay, and is

also found near the center of the state. But the most important minerals are the natural gas and petroleum of the vast fields near Shreveport and Monroe and in the south. Much of the country's carbon black, which is used in manufacture of automobile tires, is obtained by burning the natural gas.

IN THE GAY SEASON OF THE MARDI GRAS



This is a scene in New Orleans during the festival of Mardi Gras, immediately preceding Lent. At this time, the people of the great Louisiana city throng the streets in gay costumed crowds, swelled by thousands of visitors from all parts of the United States. Here we see a float in one of the famous Mardi Gras processions.

In recent years, Louisiana has progressed greatly in industry. Petroleum refining is a major occupation. Lumber mills scattered throughout the state boost Louisiana high in timber products. One of the nation's largest sawmills, at Bogalusa, has a daily output of close to a million feet. Cane sugar refining, the manufacture of food preparations, rice cleaning and polishing, and the preparation of cotton-seed oil and cake provide a livelihood for thousands.

Centers of Manufacturing

Many manufactures center in New Orleans. Fast-growing Shreveport, the state's second city, is busy with oil refineries, lumber mills, and fertilizer and glass plants. Baton Rouge, the state capital—a picturesque and historic old French-Spanish town on the Mississippi River—is a great petroleum refining center, shipping oil in tank steamers to all parts of the world. Monroe produces gas and carbon black in great quantities, and Alexandria echoes the buzzing of saw mills. Lake Charles, with one of the world's largest rice mills, ships to the Gulf through a deep channel.

With its 3,000 miles and more of navigable waters, making a web of paths to the ocean, Louisiana is one of the richest states in the Union in natural highways. Yet all the rest of these waterways put together are not worth the 600 miles of the Mississippi within the state, and especially the control of its outlet to the ocean. Before the coming of the railroads New Orleans was the mart through which practically all

the commerce of the whole Mississippi valley must pass. Elsewhere are described the factors which will give it immensely increased importance in the future, when the north-and-south tide of continental commerce becomes comparable to that which now flows east and west (see New Orleans). Railroad facilities, rather scanty until recently, have nearly doubled within the last few years, and water competition has resulted in cheaper freight rates.

The early history of the state is reflected not only in the many French and Spanish names on the map, but also in the strong French and Spanish elements in the population, customs, and architecture—especially in New Orleans, Baton Rouge, and other old towns—and even in the Latin basis of the state laws. Louisiana is the only state in the Union in which the legal system is not based on the English common law. When under the control of Spain, the colony had of course been governed in accordance with Spanish laws. In that portion of the Louisiana Purchase which forms the present state of Louisiana, the United States Federal government promised not to alter the established legal system. The old Spanish laws and the then recently promulgated Napoleonic Code of France were both used by Edward Livingston and his associates in compiling the Louisiana Code between 1805 and 1824. Louisiana criminal and commercial law is largely based on English precedent, but the civil law remains chiefly French and Spanish.

A heritage from early days is the use of the name "parish" for the administrative unit which corresponds to "county" in other states.

Progressive Program of Education and Health

State-supported institutions of higher learning include Louisiana State University and Agricultural and Mechanical College at Baton Rouge, Louisiana State Normal College at Natchitoches, Louisiana Polytechnic Institute at Ruston, Southwestern Louisiana Institute at Lafayette, and Southeastern Louisiana College at Hammond. Among other well-known universities and colleges are Tulane University and Loyola University, both at New Orleans. The state's trade and vocational schools are known the nation over. There is a state-wide program of health education, and free hospital service and dental care are provided for low-income groups.

The History of Louisiana

When La Salle descended the Mississippi River, in 1682, he took possession in the name of France of the vast unknown region drained by the river, which he named Louisiana in honor of Louis XIV. Returning with a colony in 1684, he failed to find the river's mouth and landed in Texas, where he was murdered. The honor of laying the foundation of the colony fell to the Canadian Pierre Le Moyne d'Iberville, who in 1699 made the first settlement within the present state limits, and whose brother Bienville founded New Orleans. As a financial speculation Louisiana was a bitter disappointment to Antoine Crozat, who held it under royal grant from 1712 to 1717; to the creditors of John Law's "Mississippi Company," the next promoter; and to the crown, which resumed control in 1732. The most spectacular failure was that of John Law, who had promised to pay the French public debt with the proceeds of the exploitation of the colony; the expectations of profit were so enormous that there was frenzied speculation in Paris, known after his downfall as the "Mississippi Bubble."

In 1762, during the Seven Years' War, France secretly ceded New Orleans and the vast region west of the Mississippi to her ally, Spain, but the colonists did not learn of the transfer officially until two years later. Then, angered at being cast off by the mother country and fearing financial disaster in the loss of the French market for their indigo, they drove out Ulloa, the first Spanish governor, in 1768. But his successor repressed them with an iron hand, and they settled down to endure what proved to be, for an 18th century Spanish colony, a fairly liberal rule. After the American Revolution, the hardy Western boatmen and traders from the fast-growing country between the Alleghenies and the Mississippi poured their produce into New Orleans in an ever-increasing stream and were continually exasperated at the heavy customs duties levied. Threats of Western secession on the one hand, and of filibustering seizure of New Orleans by the Westerners on the other, were equally alarming to the statesmen of the young American republic and to the governors of the Spanish colony.

The cumulative pressure on the Federal government resulted in the American purchase of Louisiana in 1803 from the French, who had re-acquired it by secret treaty from Spain in 1800 (*see Louisiana Purchase*). In 1804 Congress divided Louisiana into the District of Louisiana north of latitude 33°, and the Territory of Orleans south of that parallel. In 1812 the Territory of Orleans was admitted to the Union as the state of Louisiana, with the addition of the "Florida parishes"—that part of the Spanish province of West Florida lying between the Pearl and the Mississippi rivers, which had rebelled against Spanish rule in 1810.

Louisiana's vote of secession in 1861 brought into the Confederacy the largest city in the South, with more machine shops and trained workmen than any other. From a military point of view the state's command of the mouth of the Mississippi gave it overwhelming importance. Farragut's capture of New Orleans and Baton Rouge (*see Farragut*, David Glasgow) opened the lower Mississippi to the Federal forces. During the war the portions of the state under Confederate and Federal control, respectively, were each organized with a state government. "Carpetbag" rule during the reconstruction period was, if possible, more corrupt and extravagant in Louisiana than in most of the other Southern states. Louisiana was one of the Southern states which in 1876 elected two rival sets of presidential electors—one representing the "White League" government and the other the carpet bag element—and so brought on the Hayes-Tilden disputed election. Freed of its burden of financial misrule of the Reconstruction period, the state has been able to build up substantial prosperity, particularly since the efforts of sanitarians have freed it from the recurrent danger of epidemics of disease.

LOUISIANA PURCHASE. In 1803 President Jefferson set the example of acquiring new territory by purchase rather than by war when he bought from France the vast tract of land known as Louisiana. The United States did not differ from Old World countries in wishing to reach her "natural boundaries"; she did differ in the method she used.

The city of New Orleans was greatly desired by all the people beyond the Alleghenies, for the nation that controlled this spot could control the Mississippi River. Western farmers were anxious that this control should be in the hands of the United States, for their grain, hogs, cattle, and other produce were chiefly marketed by flatboats which floated down the great "Father of Waters."

Spain had held this important gateway to the West ever since 1762, when she acquired it by treaty from France. Then, suddenly, in 1802, news came that Napoleon had forced the weak country of Spain to give New Orleans and the whole Louisiana territory to the all-conquering French. This was bad news for the western farmer, for France was then the most powerful country in the world, and there was no hope of forcing from her any privileges.

Napoleon's dream of a vast colonial empire vanished, however, almost as suddenly as it had come. England took up anew the struggle in Europe, and it was folly for France to try to hold distant territory while England controlled the seas. Robert Livingston, the American minister to France, pointed out this fact to Napoleon, and in spite of all protests that monarch decided to sell Louisiana.

When, therefore, James Monroe arrived in France with power from President Jefferson to buy New Orleans and West Florida for not more than \$10,000,000, he was offered the *whole* of the French territory for approximately \$15,000,000. Although the American agents had no authority to make such an extensive purchase, they signed the treaty of purchase on April 30, 1803. In December the French flag was hauled down and the Stars and Stripes were hoisted over New Orleans, as a sign that the domain of Louisiana had come under United States rule.

Thus at one stroke the area of the United States was doubled. President Jefferson believed that the annexation and government of so vast a territory was unconstitutional, and wished to have an amendment to the Constitution adopted ratifying it. His cabinet did not think this necessary and their views prevailed. The New England Federalists were enraged at the prospect of the admission of numerous new states, whose votes in Senate and House would reinforce those of the South and West; and some, like Josiah Quincy, openly advocated secession—"amicably, if they can; violently, if they must." But the people generally approved of the purchase, as well they might. Thirteen of the 48 states now in the Union were included in the purchase either in whole or in part, and the value of this land lying between the Mississippi River and the Rocky Mountains is now more than 400 times as great as the price paid for it. (See the map which accompanies the article United States History.)

LOUISVILLE, Ky. The Falls of the Ohio River determined the location of Louisville, and the broad curve of the river above the falls provided one of the best harbors in its whole course. Here in pioneer days a portage around the falls enabled the upriver and downriver boats to exchange cargoes. Warehouses sprang up, and this river port on Kentucky's northern border became the wholesale and distributing center for a growing agricultural and mining area.

When the Louisville and Portland Canal around the Falls was completed in 1830, the profitable portaging business vanished, and the city turned to manufacturing. Coal from the near-by Kentucky fields provides abundant fuel, and eight railroad lines supplement the cheap river transportation. Rich farmlands supply raw materials for the two leading industries, whisky distilling and tobacco manufacturing. Louisville was long the greatest hogshead tobacco market in the world. Although the Breaks, as the market is called, has lost its former importance, the city is now one of the country's largest producers of cigarettes.

It has large railroad shops, and other industries include flour milling and meat packing, and the manufacture of railroad, air-conditioning, distillery, and oil-refining equipment, textiles, chemicals, and furniture. The largest city in the state, Louisville lies on a level flood plain with the river on the north and west, and low hills on the south and east. The residential area reaches into the Highlands. On the outskirts is Churchill Downs, the horse-racing track where the famous Kentucky Derby has been run every May since 1875. The University of Louisville, founded in 1837 as the Louisville Medical Institute, is the oldest municipal educational institution in the country.

La Salle is believed to have visited the site of Louisville about 1670. George Rogers Clark established the first permanent settlement in 1778 as an outpost against the British. It was named in honor of Louis XVI of France. During the Civil War it was a Union military headquarters. In 1890 a windstorm killed 106 persons. The Ohio River flood of 1937 resulted in a property loss of \$52,000,000. The Louisville *Courier-Journal* gained national fame under the brilliant editorship of Henry Watterson, its founder. Louisville was the home of Zachary Taylor, 12th president of the United States, and he and George Rogers Clark are buried there. Population (1940 census), 319,077.

LOUVAIN (*lo-vân'*, Flemish *Leuven*), BELGIUM. In the 14th century the charming old town of Louvain on the Dyle River was the capital of the Duchy of Brabant and one of the leading cloth-weaving centers of Europe. A feud between citizens and patricians toward the end of the century led to the decline of its wool trade and to the rise of Brussels, 18 miles to the west. After the founding of its famous Catholic university in 1426, however, Louvain became a noted seat of learning.

Of the town's many beautiful old buildings, two are outstanding. The Gothic town hall and the church of St. Pierre, both built in the 15th century, are among the finest medieval structures in Europe. In the 17th century the university was removed to the old Cloth Workers' Hall, an early 14th-century building. One of the town's chief treasures was the university library, which contained many priceless old manuscripts and early printed books. It was destroyed in August 1914 when the Germans set fire to the town. A new library built and endowed with a million dollar fund contributed by Americans was opened in 1928. Its stock of 700,000 volumes came from sympathizers throughout the world, and from Germany under the terms of the Versailles Treaty. In May 1940, only 12 years after its dedication, the library was again destroyed, during a German invasion. Population, about 41,000.

LOWELL, JAMES RUSSELL (1819-1891). "If writing poetry were a profession I should be a poet," Lowell declared when at 19 he was graduated from Harvard. Realizing that poetry alone would never earn him a living, he tried, though unsuccessfully, to follow the law. His friendship with Maria White was also a stimulus toward literature. Being a poet herself of no mean gifts, she sympathized with Lowell's tastes and encouraged him to continue writing. They married in 1840, and although for many years they had

little money, they were very happy. Lowell wrote some of his best poems, such as 'The Vision of Sir Launfal' and 'To a Dandelion' during this period.

There was another side to Lowell's nature which the stormy times just before the Mexican War could not fail to arouse. Believing that he saw the United States about to enter an unjust war for new territory, into which slavery might spread, he expressed his disapproval in a series of poems in Yankee dialect called 'The Biglow Papers'. These contain much of the moral force, sly humor, and close-packed phrases of the New England farmers and small-town people. To the period of the Mexican War also belongs Lowell's noble poem 'The Present Crisis'.

The busy productive years following Lowell's marriage were much shadowed by family afflictions. His wife, whose health had long been delicate, died in 1853. But his literary work had gained him fame, and in 1855 he was asked to give a series of public lectures in Boston. His success led to his being offered the professorship in French, Spanish, and general literature at Harvard. He accepted the chair but asked for the opportunity to go to Europe for a year in order to renew his knowledge of modern languages. On his return he married Miss Frances Dunlap, who had been acting as governess for his daughter, and settled down to a serene and busy life in which teaching and writing shared his attention.

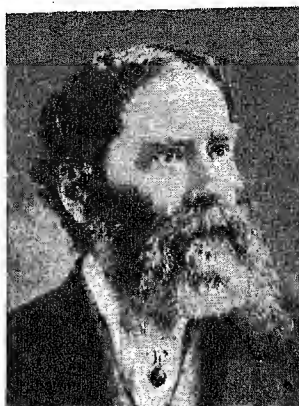
In 1857 he became editor of the *Atlantic Monthly*. Even after resigning that post four years later, he contributed his poems largely to that magazine, his prose writings going to the *North American Review*. During the time that he was on the Harvard faculty, prose was his usual method of expression. He wrote largely travels, criticism, literary and political essays, including work of such keen insight that he has been ranked by many as America's leading critic. 'On a Certain Condescension in Foreigners' and 'Keats' are among his most refreshing and characteristic essays. His literary criticisms were particularly valuable because, like much of Longfellow's work, they helped acquaint Americans with Europe's literary riches at a time when growing interest in literature made the influence most valuable.

He did write some poetry in this period, however, and one effort is of very great merit. The 'Commemoration Ode', written in 1865 in honor of the Harvard soldiers fallen in the Civil War, is a stirring piece of work. He himself felt that he "had written something really good at last." The passage on Lincoln is one that we should not like to lose from American literature, so clearly does it express, along with his admiration for the great man of the people, Lowell's real love for true democracy. In 1877 Lowell was

called from his university work to become the United States minister to Spain, later exchanging this post for that to England. In the latter position he did much to bring the two countries more closely into sympathy. His charm of manner and his power of making clever impromptu speeches made him popular in British society.

The last years of his life were spent in Cambridge among his books and friends. He died honored as poet, essayist, and a man of distinguished public service, not only in America, but also in England, where his fame is kept alive by a memorial window and a tablet in the Chapter House of Westminster Abbey.

Among Lowell's prose works are 'My Study Windows' (1871); 'Among My Books' (1870); 'Among My Books, Second Series' (1876).



JAMES RUSSELL LOWELL
Writer and Diplomat

LOWELL, MASS. One of the oldest of the great American industrial cities, Lowell was founded in 1822 by the Merrimack Manufacturing Company, and was named in honor of Francis Cabot Lowell, who had improved Cartwright's power loom. This corporation bought a site at the junction of the Concord and Merrimack rivers and set about harnessing the 32-foot falls of the Merrimack, drawing the water through five miles of canals to various factories. Today those canals develop 15,000 horsepower. This tremendous water power is supplemented by great steam plants.

Lowell was chartered as a city in 1836 and has since become a chief textile center. It has huge cotton mills and hosiery, underwear, woolen, worsted, felt, and carpet factories, besides tanneries and bleaching and dyeing works. After the partial loss of the cotton-textile industry to the South in the 1920's the manufacture of clothing, shoes, and other products was developed. Lowell has the world's largest factory producing upper leather; also the most famous textile school in America. This school's work in cotton and wool manufacture, design, chemistry, and dyeing, supplemented by special courses in the public schools, has provided technical skill for the factories.

The artist Whistler was born here, and his old home is now an art museum. Lucy Larcom, famous as the "mill girl" author, lived in Lowell and worked in the mills. Population (1940 census), 101,389.

LOYOLA (*loi-ō-lā*), **IGNATIUS DE** (1491-1556). Until his leg was shattered by a canon ball at the siege of Pampeluna (1521), the future founder of the Jesuit order and the greatest opponent of Luther's teaching was known only as a courtly Spanish nobleman and soldier. The reading of the lives of the saints during his long convalescence turned him from the quest of military glory and made him a soldier of Christ. His sword and dagger he hung up on the altar of a monastery chapel. His worldly garments he gave to the

poor, taking a pilgrim's dress of sackcloth and hempen shoes, with a staff and gourd. Seven hours a day he spent on his knees in prayer and thrice a day he scourged his wasted body.

With difficulty Loyola reached Jerusalem, but he was not allowed by the authorities to remain and labor there as he had planned. Back in Spain, at the age of 32, he again became a schoolboy to learn the Latin needed for his religious studies. The next ten years he spent at schools and universities in Spain and in Paris. Again and again he was suspected of heresy and was imprisoned—at times loaded with chains—by the Inquisition for teaching before he had completed the prescribed studies.

Meanwhile his plans were taking more definite form. He would found a "Society of Jesus"—spiritually drilled and disciplined like a military company—to combat heresy and do missionary work in heathen countries. The members should be bound by the monastic vows of poverty, chastity, and implicit obedience, but they should wear no distinctive dress and should not be tied down by minute monastic rules or unusual forms of discipline.

In 1534, at Paris, Loyola, and his six companions formed the beginning of this organization. In 1540 its members received at Rome the sanction of the pope, and Loyola became its first "general" or commanding officer. The remainder of his life, until his death at Rome in 1556, was spent in working out, with infinite skill, the constitution of his order, and preparing it for that conflict with the Protestant Reformation in which the Catholic church was to win back half the lands which it had lost through Luther's revolt. In 1628 Pope Gregory XV canonized him as St. Ignatius of Loyola.

One of Loyola's earliest associates was Francis Xavier (1506-52), a native of Spanish Navarre, who spent the last ten years of his life as the first great missionary to the Indies, Japan, and China. (See also *Monks and Monasticism*; Xavier, Saint Francis.)

LUBRICANTS. The worst enemy of machinery is friction. It wears out the metal, wastes power, and generates heat. So greasy substances called lubricants (from the Latin word *lubricus* meaning "slippery") are applied regularly to the bearing surfaces of machinery, that is, the surfaces that rub against each other.

But not just any oil or grease will do. Let it lack but one of the qualities of a good lubricant and it may mean a ruined machine. A lubricant must have "wetting power" so it will spread easily over metal and penetrate between surfaces that are in close contact with each other. It must cling to the surfaces so that rapid friction will not rub it off. It must not evaporate or in any other way change its essential greasiness. Freedom from acid and grit is important, for these will corrode or scratch the bearings. Furthermore, a lubricant must not catch fire easily or become gummy at low temperatures.

The quality of a lubricant which makes it cling together and resist being squeezed out of a bearing is

called its *viscosity*. This is opposed to freedom of flow. So the two qualities must be balanced to suit the lubricant's purpose. For heavy loads more viscosity is needed; for high speeds, more freedom of flow. Cold increases viscosity; this is why automobiles require different lubricants in winter and summer.

Most of our lubricants come from petroleum (see *Petroleum*). These range from very light oils to heavy greases. For very heavy machinery, greases are often mixed with graphite (see *Graphite*).

Animal and vegetable oils have been used as lubricants since long before the discovery of petroleum oils and greases. Oil from the head of the porpoise and dolphin oil are used in watches. Sperm oil from the head of the whale lubricates fine machinery. Tallow oil, lard oil, and neat's-foot oil (obtained by boiling the bones of cattle) are often blended with mineral oils. Among the more important vegetable oils used as lubricants are castor oil, olive oil, and those extracted from cottonseed, corn, and rapeseed. These too may be mixed with mineral oils.

LUCKNOW (*lūk'nou*), INDIA. Lucknow will go down in history for the heroic sieges it sustained in 1857, when it was held by a small British force, first under the command of Sir Henry Lawrence, a noted Indian soldier and administrator, and after its first relief under the command of Havelock and Outram.

When the storm of the Sepoy Mutiny broke in June 1857, Lawrence retreated, after a preliminary skirmish with the rebels, to the British Residency in Lucknow. The building was the official house of a British commissioner in the province of Oudh. Lawrence put it into a state of defense, entrenched the surrounding 60 acres with its outbuildings, and defied the rebels. His force consisted of 1,720 men, of whom 712 were loyal Indian soldiers, and 153 British civilians. He had to defend 1,280 old men, women, and children, without artillery or a great supply of ammunition. He died from a wound in the early part of the siege, which lasted from July 1 to September 25. On this date Generals Havelock and Outram with about a thousand men relieved the defenders, now reduced to less than a thousand. The combined forces could not cut their way out, and the siege went on. Havelock grew sick, and Outram carried on the defense against the rebel army of 60,000. The situation was desperate. Then from the top of the Residency they saw the signals of Sir Colin Campbell, the hero of "the thin red line" at Balaklava. Campbell recaptured Lucknow and on November 17 broke through and joined forces with the weary defenders in the Residency. Havelock died soon after. The Residency, like the fatal well at Cawnpore where the mutineers threw the remains of the massacred British women and children, is preserved as a memorial.

Lucknow is today a great manufacturing and railroad center, and the headquarters of a British army division. There are many secular and missionary schools for European and Indian children. Population, about 275,000.

LUDENDORFF, ERICH VON (1865-1937). Hindenburg was the idol of the German people during the World War of 1914-18, but General Ludendorff was the chief thinker and driving force in German military policy. Before the war he was head of the Operations Department of the General Staff, where he had a hand in shaping Germany's military preparations. At the outbreak of hostilities he took part in the attack on Liège, and three weeks later was sent to Russia as chief of staff to Field Marshal von Hindenburg. These two, the "brain" and "arm" of the German army, were for a time the real masters of Germany.

It was Hindenburg who received the credit for the victories; it was Ludendorff, bent double over his maps and papers, who planned the campaigns. He took part in the operations against Russia in 1915-16 which forced their evacuation of Russian Poland, and he was responsible for the swift and highly successful Rumanian campaign. It was not until the German offensive of 1918, his final effort, that this "German Napoleon" met his Waterloo. After the crash in November 1918, he resigned his post. He later published 'My Own Story', his personal account of the triumphs and final failure of Germany.



LUMBER. Although lumber has been replaced in the building of large structures by iron and concrete, the demand for it is constantly growing. The list of its uses is a long one. In the building of houses and smaller buildings wood is still used to a great extent and even in great modern office buildings wood is generally used for doors, floors, etc. Billions of cords of spruce and other woods are used yearly in the manufacture of paper. No good substitute has ever been found for wood for railroad ties, and these must be replaced every few years. Wooden ships still sail our rivers and engage in coastwise traffic, while, just for matches, many million feet of pine lumber are cut every year in the Great Lakes district alone. The development of the airplane has led to new demands for spruce timber—especially the

Pacific coast varieties—for the making of airplane ribs, spars, and other parts. When we think of the telegraph and telephone poles, the furniture made from the beautiful hardwoods, the shingles, barrels, and boxes that we use, it is not hard to realize that the timber industry in the United States is a very important one.

Fortunately a large portion of America is still wooded. There are timberlands in the East and "wood-lots" wherever one may go. In the West there are finer forests, for the West is the home of great trees. Although little more than a quarter of the United States is now covered with forests, it has still more woodland than any other country in the world, except Russia. After Russia and the United States, Canada is next in extent of its wooded territory.

WHERE THE "LUMBERJACKS" LIVE

Each lumber region has methods adapted to the particular conditions that exist there. Specially heavy machinery is used in the West where the trees are so large. But it is up in the north woods of Wisconsin, Michigan, Minnesota, and eastern Canada that lumbering is most picturesque. Here the work is done when the forests are locked in the winter's ice and snow, and the lumberjacks must be strong, hardy men to work in that cold biting weather day after day.

A lumber camp in the north woods is a little settlement of log huts huddled together. The largest of the huts is the men's camp, which is one large room with bunks arranged around the walls two or three tiers high. The cook camp is also one large room with a huge range and cook table in one end. Here are long tables, laid with a great array of tin plates, tin dishes and tin cups, and knives and forks of heavy steel with heavy iron handles. Then there are the stables, much like the other shanties but with lower roofs so that the animal heat of the horses and the oxen may help keep them warm. The blacksmith shop is also low roofed, and the storehouse, located alongside the cook camp, is almost buried in the snow, so that the provisions will not be damaged with the cold. A little log hut standing on one side is the office or "van" where the camp clerk keeps the accounts and



We are here at the beginning of the long lumber route which leads from the great forests, down trails and rivers, over railways and through mills until it reaches our lumber yards. These lumber camps are rough and ready places, moving from time to time as the timber is cut away.

lists of the general merchandise required. Here are the bunks of the foremen in charge of the work, and here also is a stock of mackinaw jackets, heavy woolen

underwear, shoe-packs, mittens, caps, tobacco, pipes, stationery, and other supplies. So you see this is a regular little village in itself, and it needs to be, for usually it is a long journey to the nearest town.

Long before daybreak the camp is stirring, and by the time the sun has risen the men have eaten breakfast and are on their way into the woods. They are a motley crew, in the bright mackinaw jackets of varied colors and their yellow and green stag trousers.

A tree has been marked for cutting and notched. This notch is a foot or more deep on the side toward which the tree is to fall and governs the direction of the fall. So accurate are the

HAULING LOGS IN MINNESOTA

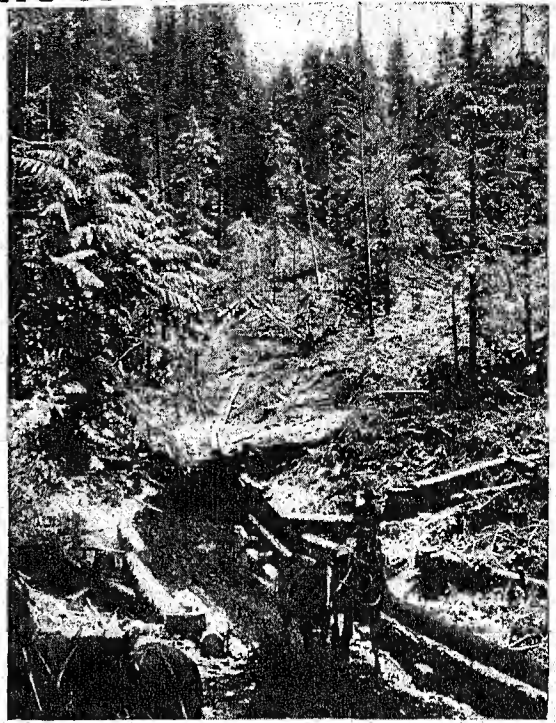


These men are loading logs on a big sledge. The sledge runs on a road which is flooded daily with water and thus kept coated with ice. The logs are hauled to a nearby river.

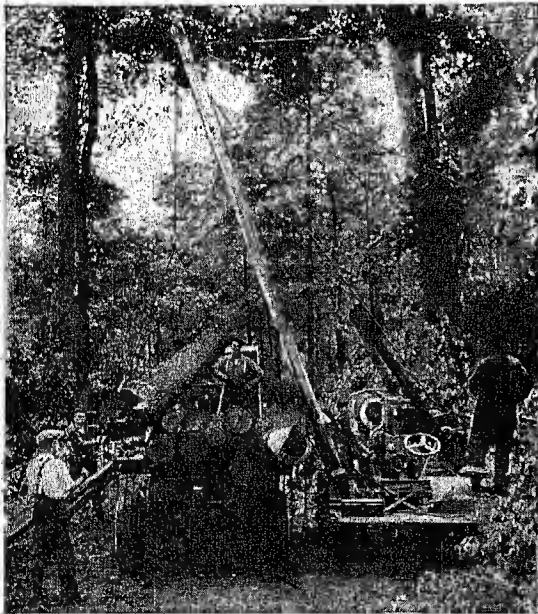
FOUR SCENES IN THE LIFE OF A LUMBER LOG



It is in the winter time when the ground is covered with snow that the sturdy lumberjacks do their work and my! what appetites they have after several hours' work sawing down trees like this. All the felled trees have been marked for cutting during the previous autumn by experts, who judge when they are ready to be made into lumber. When it is possible the trees are felled so they lie pointing down hill. This makes it easier to haul them out.



How do these immense logs get to mill? By various routes, and, like human travelers, frequently they have to "change cars." This picture shows one of these means of travel—a wooden runway in which logs are placed and hauled down the declivities by horses. Sometimes the runway is greased, and when snow is heavy the work is easy. The first logs that pass smooth the snow and the rest slide easily, or else the snow becomes ice, which is even better.

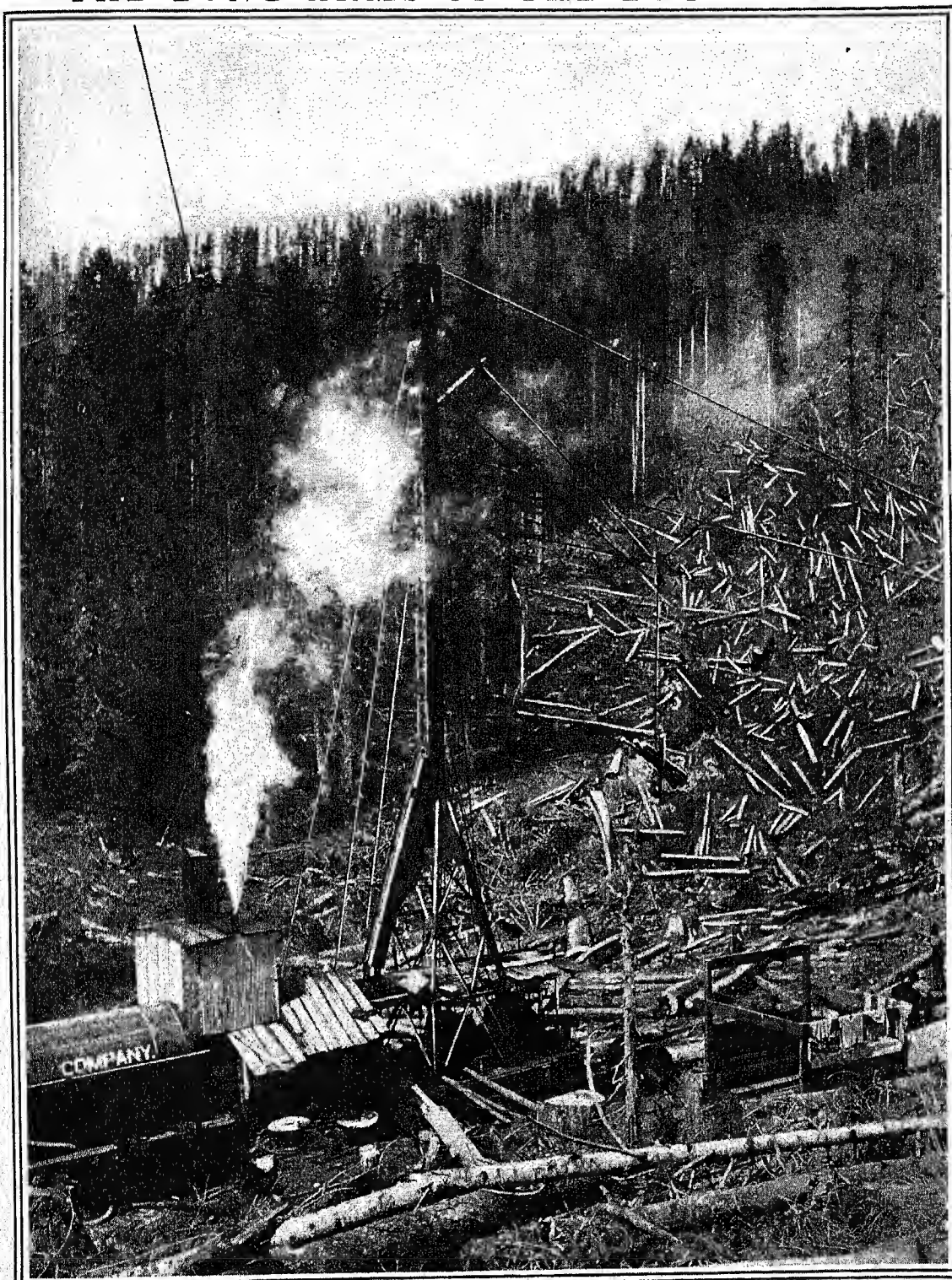


This picture shows a method of loading in the summer time. The logs are hoisted upon motor trucks by the block and tackle arrangement, called a "skidder." This skidder runs on "caterpillar" wheels. The hoisting is done by a steam engine mounted on the platform of the skidder and the logs are guided to their place on the load by two men.



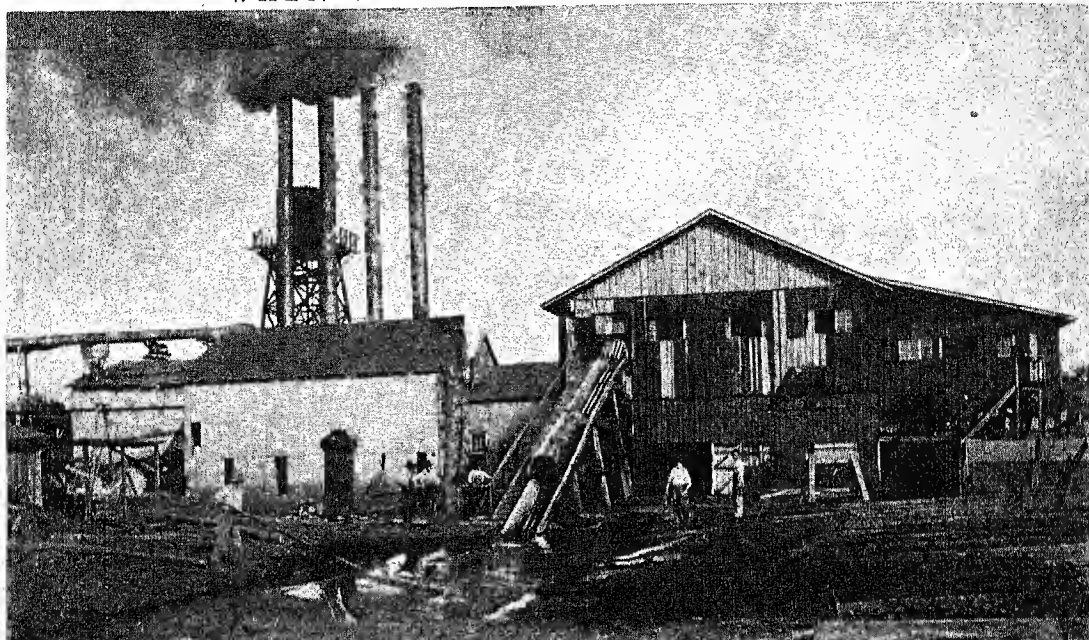
Sometimes a convenient mountain stream is harnessed and made to haul logs out of the woods in the manner shown above. A sluice-way is built and the stream, or a portion of it, is turned into the upper part. Then the logs are dumped in, and rush and bump down the slide with the water until they reach the collecting point.

THE LONG ARMS OF THE LOG LOADER

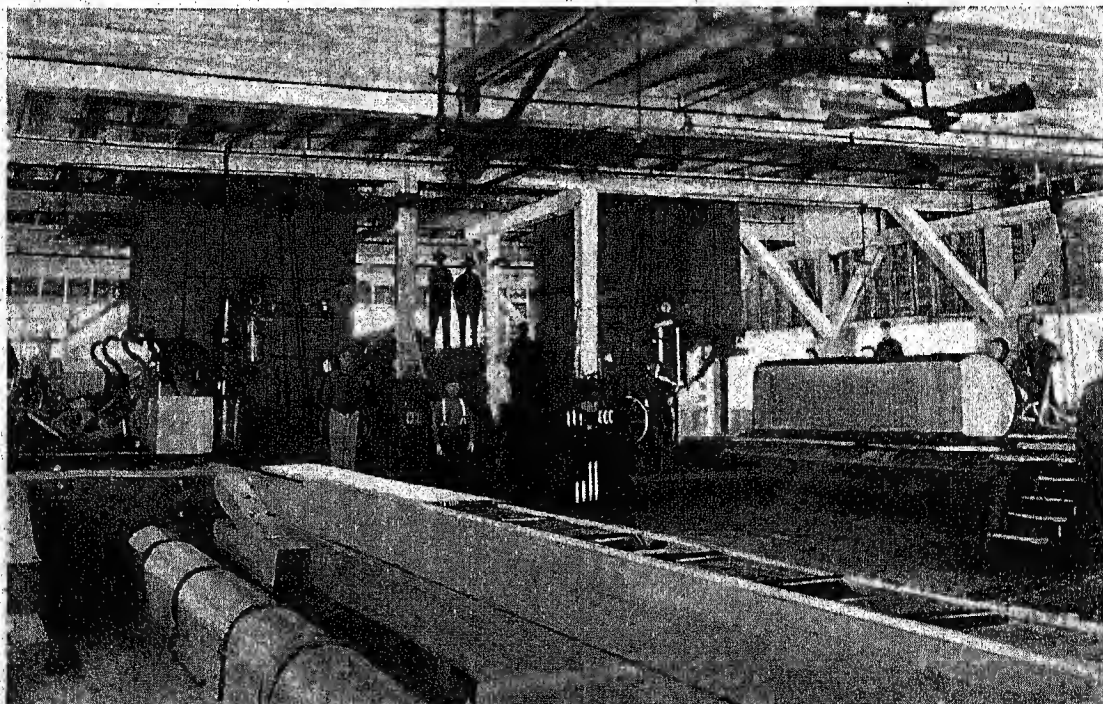


Here is an arrangement that saves climbing all over a mountainside in order to pile the scattered logs. It consists of a simple arrangement of block and tackle. Cables are carried to different points as needed, and the loader runs out along the cable, picks up the logs, and brings them to a central point. From here they are sent on their way to the mill. Thus one "set up" of the derrick and rigging collects logs from the entire mountainside, and when the space is cleared, the whole equipment can easily be moved to another location. The arrangement is one of the many ways in which modern engineering helps in speeding up production in the lumber industry.

WHEN THE LOGS GET TO THE MILL

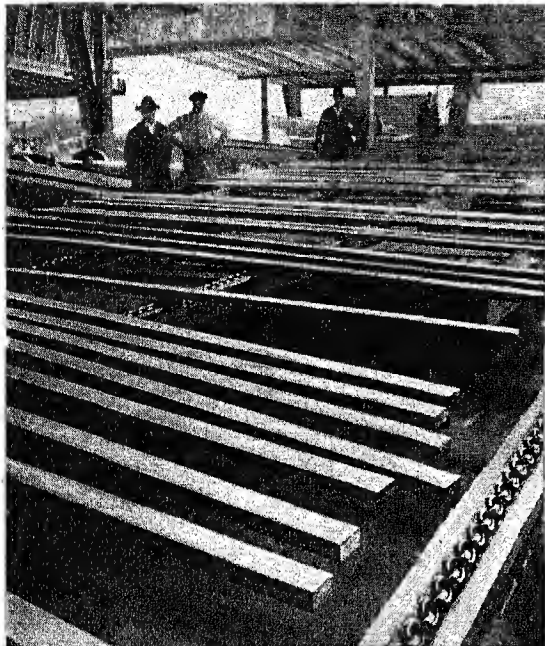


When the logs get to the mill they will climb right up the "moving stairway," just as you see this log doing here. The logs with which the big saws are supplied are kept "in store" in the water at the foot of the runway, and there, with the help of a man with a long pole to guide them, they are taken from the water by an endless chain with cleats. The logs rest against the cleats, and are carried up into the mill. But before the saws are set to work on them, these logs are given a hot bath—that is to say, they are sprayed with hot water. Remember that these logs have been lying on the ground and have been dragged about more or less and the rough bark collects sand, small pebbles, and bits of stone. These wouldn't be good things for the teeth of the saw to bite into.

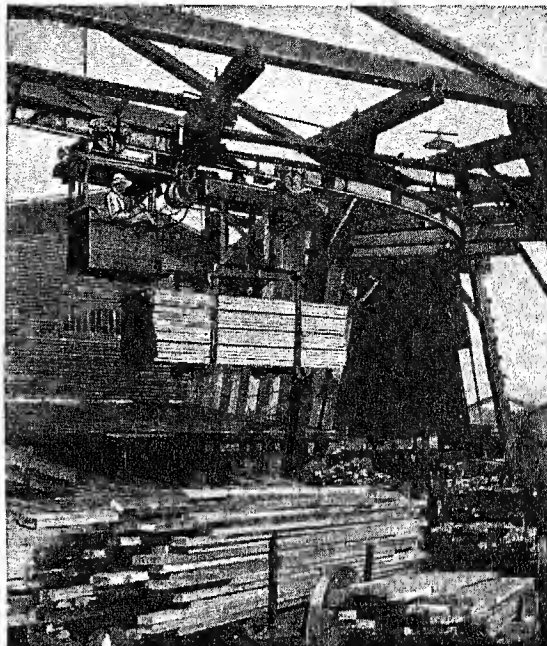


In the background is a log from which several boards have already been sliced. It rides on a carriage which passes it back and forth against a band-saw, which you can see just beyond its far end. The man at the nearer end uses the lever to control the machinery which turns and shifts the log on the carriage so that the planks will be cut just right. Band-saws are long flexible strips of steel which run over drums, like the belt of a sewing machine. They work better than circular saws.

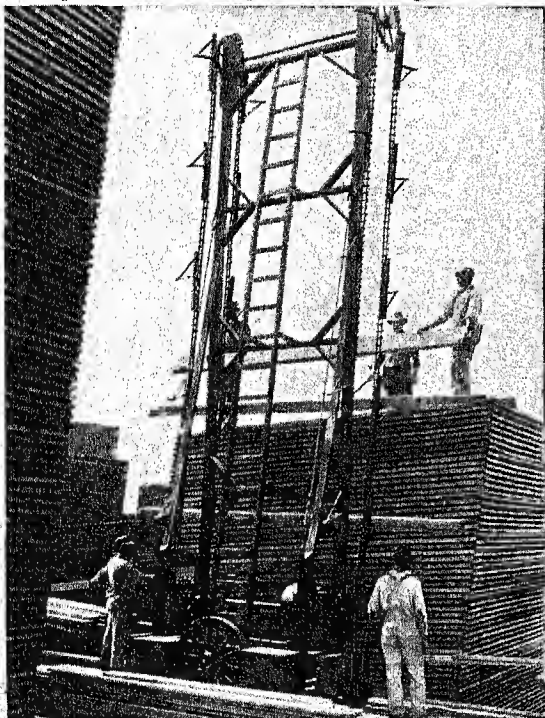
PUTTING ON THE "FINISHING" TOUCHES



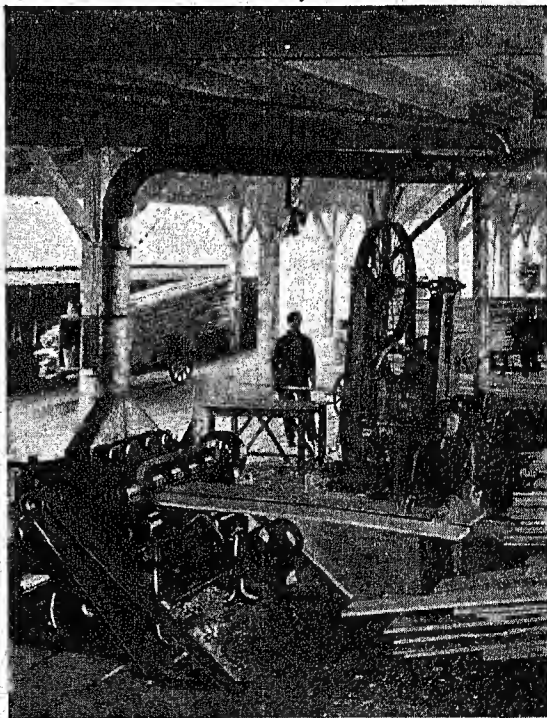
Here is where lumber passes before inspectors to be judged. Lumber is graded according to its strength, durability, and freedom from knots and other blemishes. If it is to be used for interior finishing or for furniture, its beauty of grain is also an important factor. In the mills, experts grade the lumber, keeping in mind these qualities, and they mark each piece as it is carried past on the "sorting" chain.



This curious railway up in the air is called an "overhead monorail"; it carries the lumber out of the mill to be stacked and dried. The trees of course had moisture in them when they were felled, and gathered even more from lying about in the snow and floating down rivers. So they were soaked through when they were sawed, and the planks must be dried and seasoned before they will be fit for use.



After it comes from the mill, lumber is stacked in spaced layers like this, to let the air circulate between the boards. In mill yards this is done to let the original moisture evaporate, and in local yards, so the boards will dry after rain and snows. In big lumber yards machinery helps do the piling.



Here is a planing mill at work, smoothing off the surfaces of the rough planks that come from the saws. This planed lumber is then used for floors and fine work where rough planks would not do. Other machines cut tongues and grooves when desired. Planed lumber is stored under cover.

axmen that they can drive into the ground with the fall of the tree, a stake set 50 feet from its foot. Sometimes the felling is done by sawyers, using a long double-toothed saw, one at each end, on the side of the trunk opposite the notch. An iron wedge driven into the cut prevents the tree's weight from pinching the saw. When the tree falls, the branches are chopped off and the trunk is cut into log lengths.

Logs go to the sawmill in the large modern logging operations far differently than they did in the older lumber camps. Formerly they were sledged to the nearest stream along a road that was flooded each day with water and allowed to freeze. When spring thawed rivers and lakes, they floated down to the logging town. At a bend, or some other stream obstruction, the great mass of logs might jam together and refuse to move. Then daring loggers would make their way across the tumbling icy timber to find the "key" log and move it so the mass could get under way. In the great rivers, the logs were sometimes fastened together in huge rafts or booms for the final stage of their journey to mill. The Mississippi, the Ottawa River in Canada, and other streams from the old timberlands were filled with these rafts in springtime.

Old-time lumbermen say that the adventure has gone from logging now that railroad spurs run to the timber tracts of the larger camps and the logs are snaked to the tracks by steam "skidders." But the "high rigger" of the big western camps has a dare-devil's task in fastening the block and tackle of the dragging cable to a high tree. After he cuts the top off the forest giant, its fall makes the tree sway violently in an arc of maybe 40 or 60 feet, so that he must cling for life with spiked shoes and hands. Sometimes the tree splits and spreads the rope belt running around him and the trunk, crushing the climber or breaking the belt. After the "topping" he fastens the cable pulley to this high stump.

Where the Logs are Changed to Lumber

A great sawmill in operation is one of the most interesting places to visit. The logs, which float in the water within the confines of a "boom" or chain of other logs, are guided to a "log-slip" or runway where a continually moving cable snatches them from the water and after carrying them under a cleansing spray of hot water lands them into the mill. Here they fall upon a carriage which brings them to the saw.

Formerly circular saws—mounted one above and one below for big logs—were used; and it was a fine sight to see the log carriage go racing back and forth like a shuttle while the sawyer moved the levers controlling its course and shifted the log each time with skilled judgment so that it should be sawed to the best advantage. The "zip" of the saws—now high, now low—telling of the progress of the sawing made a music as fascinating as the spectacle, while the odor of fresh sawdust added to the pleasure.

Today circular saws are used in the big mills only for trimming boards and for similar minor operations. The sawing of the logs is done entirely by "band" saws

so mounted that each makes a continuous band or ellipse, traveling at a tremendously rapid speed over one wheel above and another below the sawpit. Such saws move at more than 20 times the speed of a "reciprocating" saw, or one which moves up and down in the jig-saw fashion. Often a number of band saws are mounted in "gangs," so that the entire operation of sawing the log into boards is done with one forward movement of the log carriage. Another advantage of the band saws is economy, for they waste much less of the log than is the case with the circular saws.

The Saws that Wear "False Teeth"

An interesting fact in regard to the circular saws of today is that they often have false teeth! It was discovered that no matter how finely the teeth were tempered and how hard the steel was made, the *buzz-zipping* through the hardwood logs tended to break them off. So saw-makers now make the teeth separately and set them in the blade, and when one breaks or wears out a new tooth is easily inserted.

In any well organized sawmill the bark-covered slabs and the trim from the edges of the boards and planks is worked up into laths, shingles, and similar small wares, or sawed into lengths for fire-wood. Even the sawdust is used, for it is burned as fuel in the engine room, or distilled to make wood alcohol.

The product of the sawmill is rough lumber and the operation may stop at that point. But sometimes a planing mill is operated together with the sawmill, and the lumber is cut into smooth-faced boards or shaped into moldings and like products. The lumber as it comes from the saw is green or wet and must be dried before it is shipped to market. This is done either by piling in a yard so that every piece may be air dried, or putting it through a steam kiln.

Lumber is graded according to its strength, durability, and freedom from knots and blemishes. If it is to be used for woodwork or furniture, its beauty of grain is also an important factor; sometimes "hardwoods," such as oak and sycamore, are "quarter sawed" so as to show more of the edge grain.

In the United States the principal kinds of lumber are yellow pine, Douglas fir, and oak. Hemlock and white pine are also valuable woods. Some of the big redwood trees of California are 30 feet thick, and have to be sawed into several logs by enormous saws and then split with dynamite so they can be handled at all. The principal varieties of Canadian lumber are spruce, Douglas fir, and white pine. The great tropical forests of South America produce rosewood, mahogany, and other woods valuable for furniture making and cabinet work. In nearly every country of the world are timber woods so valuable and beautiful that they are got to market at the greatest labor and expense.

The forests which once covered such a large part of our continent have grown smaller and smaller. There were such immense forests that little thought was given to their preservation. Today when an area of 7,000 square miles of forest must be cleared

every year to supply the needs of the United States for board lumber alone, it is easily seen that without scientific regulation and reforestation the forests would soon be gone. (See Forests and Forest Protection; Furniture; Trees.)

LUNGS. The human lungs are as complicated and their functions as wonderful as those of any other part of man's amazing body. (See Blood; Respiration.) The windpipe divides into two main branches—the bronchi. These enter the lungs, and are subdivided again and again into the bronchial tubes, which branch like the twigs of a tree. The smallest divisions enter into air sacs, which are lobulated and have very thin walls. A network of capillaries is spread over the thin walls of the air sacs. It is through these capillaries that the blood's intake of oxygen and release of carbon dioxide take place. The blood, however, does not anywhere come into direct contact with the air. The gases pass back and forth through the walls of the capillaries and the air sacs.

Inside Our Lungs

The lungs are marvelously intricate and delicate in structure. Their air passages keep branching out again and again until they form about 400 million tiny tubes, and at the end of each tube is an air sac. Each sac is tinier than the head of a pin, and a red blood cell can pass around it in a single second. It is during this second that the blood gets its oxygen and gives up its carbon dioxide. The air sacs are very elastic, and when air is drawn into them they expand to three times their resting size.

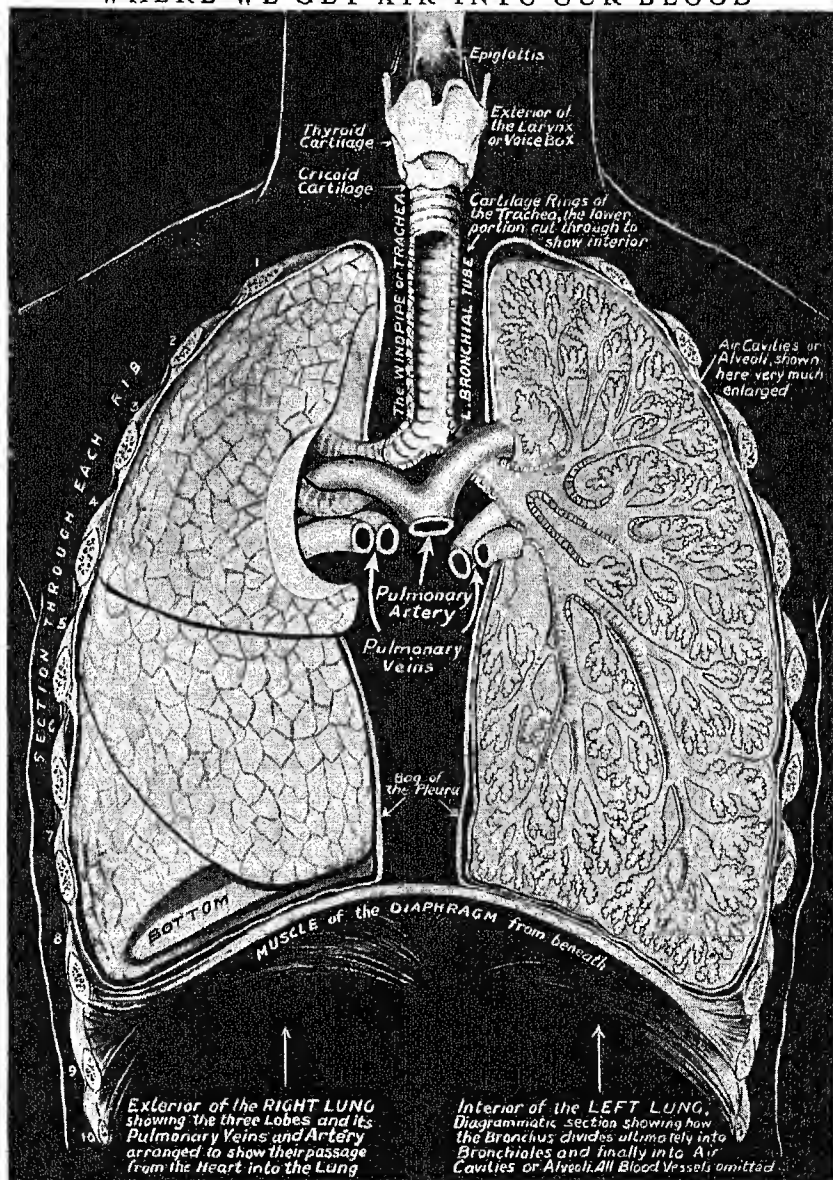
The Dust Removers

All the 400 million tubes from the air sacs and all of the larger passages into which the tubes lead are lined with countless delicate hairs called *cilia*. These lash rhythmically back and forth about 12 times a second. The work of these cilia is to protect the air sacs by driving out the dust particles that are constantly

getting into our lungs. On the back stroke they are curved over to pass under the dust particles; on the forward stroke they straighten up to push the particles along. In this way the particles are gradually driven up into the nose and throat where we can readily get rid of them.

The substance of the lungs is spongy and elastic so that they can easily expand and contract during our breathing. Numerous nerve cables and lymphatics, in addition to the networks of blood vessels, branch through the lungs, adding to the complexity of their structure. Each lung is contained in a sac called the *pleura*, similar to the pericardium around the heart.

WHERE WE GET AIR INTO OUR BLOOD



Here are the lungs, from in front. At the left we see how the large air tubes and blood vessels enter the lungs. At the right we see the internal structure of the smaller tubes and the air sacs.

WHEN LUTHER BURNED THE POPE'S BULL



This incident marked the most dramatic moment in Luther's break with the church of Rome. It took place in Wittenberg, Saxony, on Dec. 10, 1520. Messengers from the Pope had brought an official proclamation or "bull" condemning Luther's new teachings, and calling upon him to retract under pain of excommunication and other punishments for heresy. Luther, who had learned that messengers were on the way, had called together the students of the University and when the bull was delivered to him he cast it into the flames.

LUTHER, MARTIN (1483-1546). "Here I stand; I can do no other; God help me! Amen!" These are the words which tradition puts into the mouth of the monk Luther in the year 1521, in the memorable scene in the bishop's palace of the quaint old German city of Worms, on the river Rhine, when he was called to account for his religious teachings. Though it is highly probable that he did not use these words, they nevertheless sum up fairly well the spirit of the long and elaborate reply which, after some preliminary hesitation, he made to the assembly.

The young emperor Charles V had just come into his German dominions from Spain, and was holding an assembly or "diet" to regulate the affairs of Germany. Among other weighty topics was the question what to do with Luther, professor in the elector of Saxony's University of Wittenberg, whose religious teachings, although formally condemned by the Pope's bull in 1520, still continued to set Germany aflame. Even the Pope's representative, Alexander, who was there to demand

that Luther's books be burned and their author sent to Rome for punishment, recognized that there were difficulties. "All Germany is in commotion," he wrote his master. "Nine out of every ten cry 'Luther,' and the tenth, if he does not care for what Luther says, at least cries, 'Death to the court of Rome!'"

When faint-hearted friends had counseled Luther to distrust the emperor's safe-conduct to Worms he had replied, "Though there were as many devils in Worms as there are tiles upon the roofs, I will go there."

The refusal which Luther gave to the demand that he recant his books was followed by the Edict of Worms, issued by the Emperor May 25, 1521. It condemned Luther and called upon all persons to seize him and give him up to a heretic's death; and his books also

were to be committed to the flames.

Martin Luther, whose teachings thus convulsed Germany, was born of sturdy peasant stock in the little village of Eisleben, Saxony. His boyhood was spent in poverty, and he sang in the streets for



MARTIN LUTHER

bread, as was the custom of poor students. Later his hard-working father was able to send him to the University of Erfurt to prepare for the study of law.

But as the result of an inner religious conflict, Luther entered the Augustinian convent of monks at Erfurt in 1505. After three years of strict monastic discipline and theological studies he became a professor in the new University of Wittenberg, and a few years later was in Rome on business for his monastic order. Luther returned from Rome still a loyal son of the church, but already he had begun to form the views which were to separate him from it. These he later summed up in the words, "Justification by faith," or salvation through trust in God's mercy and not through penances and other works of righteousness.

Luther's career as a reformer may be said to begin with the tacking of his famous Ninety-five Theses to the door of the castle church in Wittenberg on Oct. 31, 1517. Such disputations as the one contemplated were common in university life, and are met with even today. Luther's theses were an attack on the prevailing system of indulgences, as preached by Tetzel. When published in pamphlet form they attracted much attention, and controversy followed. Cardinal Cajetan was sent as the pope's legate to Luther, but could not induce him to retract his utterances. The disputation at Leipzig with John Eck (1519) merely widened the breach. In his pamphlets, 'Address to the German Nobility' and 'The Babylonian Captivity of the Church', Luther broke completely with the Roman Catholic church; and then burned the Pope's bull condemning his opinions (1520) and a copy of the canon or church law. To the faithful he was now little better than a rebel.

While returning from the Diet of Worms Luther was seized by the connivance of his friend the elector of Saxony and safely hidden in the picturesque old castle of the Wartburg near Eisenach. There he remained in disguise, concealed even from most of his friends, until the emperor's preoccupation with his wars with France over Italy made it comparatively safe for him to return to his work at Wittenberg.

In 1525 Luther married an ex-nun, Katharine Bora. This step emphasized his rejection of monasticism and celibacy for the clergy. The remainder of Luther's life was spent in writing, preaching, and

organizing the reformed church in Saxony. He replaced the Latin service of the mass with a service in the German language, and wrote many hymns which are still in use, notably the famous *Ein feste Burg ist unser Gott* ('A Mighty Fortress Is Our God'). He prepared catechisms for old and young, and completed his translation of the Bible, which still remains the standard German version. He was ceaselessly active in public affairs, being especially zealous in advocating popular education. Grievous ailments shadowed his last years, but did not check his activities.

Luther died on Feb. 18, 1546, at Eisleben, the place of his birth, just as the long deferred war to put down his teachings was about to break over Europe. His body was carried in state to Wittenberg, attended by throngs of mourners, and buried in the castle church to whose door he had nailed the Ninety-five Theses. (See also Reformation.)

LUXEMBURG. Where the borders of Germany, France, and Belgium come together on the map of Europe is a dot called Luxemburg. The area of this little state is less than Rhode Island's; its population is less than Denver's. Yet the major European powers set it up as a grand duchy in 1815, and in 1867 they guaranteed its independence to provide a buffer between Germany and France. Thus it was saved from absorption into the German Empire in 1871 and, wedged between hostile countries, it maintained a perilous existence as one of the world's smallest nations.

Most of Luxemburg (French *Luxembourg*) is a rugged forested highland. The northern half is an extension of the Ardennes Plateau and has an average elevation of about 1,500 feet. It is a picturesque region, deeply furrowed with the valleys of little winding rivers that drain into the Moselle. The southern part, a continuation of the Lorraine Plateau, is lower, with rolling hills and broad fertile valleys. Ruined castles perched on many of the heights recall the eventful rôle these peaceful-looking fields and tiny villages have played in times past. The city of Luxemburg, traditional capital of the country, is built on a crag 200 feet high. Once it was so strongly fortified that it was known as the "Gibraltar of the north." The houses of government, like many other features of the country, resemble miniature models of their counterparts in the great nations.

The Luxemburgers are of mixed origin, chiefly German. Most of them speak a Teutonic dialect akin to

THE CASTLE CHURCH



This is the tower of the church in Wittenberg to which Martin Luther nailed his famous Ninety-five Theses.

Flemish, but excellent German and French are also common. They are deeply religious and all but a few are Catholics.

Small as it is, Luxemburg has valuable resources. Its iron mines are the basis of a great iron and steel industry. Its slate, stone, brick, and cement help to construct Europe's buildings. Leather tanning and glove-making have been carried on for centuries. Agricultural products include potatoes, oats, wheat, rye, barley, and grapes. There is also an extensive live-stock industry.

Its Varied Fortunes in History

During the Middle Ages Luxemburg was one of the many small warring principalities that then were Europe. Its time of greatest power was from about the middle of the 14th century to the middle of the 15th, when it was a country of almost four times its present size. At that time the princes of Luxemburg were also kings of Bohemia. Four of them became rulers of the Holy Roman Empire—most notably Charles IV, 1347-1378.

Afterward Luxemburg was owned in turn by Burgundy, Germany, Spain, France, and Austria. When the Congress of Vienna in 1815 made it a grand duchy, it was placed under the rule of King William I of the Netherlands to compensate him for the loss of his family holdings in Germany. Dissatisfied, the Luxemburgers joined the Belgians in 1830 in a revolt against Dutch rule. Belgium became independent and took with it the western part of Luxemburg, while the eastern portion remained a ducal possession of King William. When Germany in 1867 threatened to declare war if France should obtain Luxemburg, the major powers guaranteed the independence and neutrality of the duchy. In 1890, upon the accession of Queen Wilhelmina to the throne of Holland, the ducal title passed to Adolphus of Nassau.

In August 1914 Germany invaded Luxemburg and occupied it for the duration of the war. In 1919, its independence restored, the duchy came under the rule of the Grand Duchess Charlotte. On May 10, 1940, Germany again invaded the duchy and this time incorporated it into the German Reich. The defenseless little country offered no resistance, but Charlotte, in exile, continued to claim sovereignty. Area, 999 square miles; population, about 300,000.

LYCURGUS. Some 2700 years ago the great law-giver of Sparta was fleeing for his life before a jeering crowd of his fellow citizens. A rain of stones fell thick about him, but by good hap he outran all his pursuers but one vigorous youth. As Lyeurgus turned to look back, the youth thrust at him with a staff, putting out one of his eyes. The great man uttered no word of reproach. Concealing the pain he suffered, he calmly waited for the mob to catch up. When they saw the ill usage that had befallen the greatest man of Sparta, their anger turned to dismay and shame. Repentantly they escorted Lyeurgus to his home, and delivered the youth into his hands to punish as he saw fit. Now Lyeurgus gave proof of

the greatness of his soul, for instead of wreaking vengeance on the youth who had blinded him, he took him into his home to live with him. The young man, thus having an opportunity to observe the life of the man he had so hated, presently became one of his greatest admirers, and was changed from a wild and passionate enemy of the laws of Lyeurgus to a sober and discreet citizen.

So runs one of the stories which the Greek historian Plutarch tells us of the mysterious Lyeurgus, who lived so long ago that we do not know which of the tales are history and which mere legend. The Spartans of a later day believed that Lyeurgus had been the author of all the strange laws and customs which distinguished their state from the other states of Greece, and worshiped him as a god.

Lyeurgus, who, they believed, lived about the 9th century B.C., belonged to the royal house of Sparta, and might have claimed the throne. When the king's widow proposed to him that they should destroy the infant heir and reign in his stead, Lyeurgus rejected the scheme with abhorrence and proclaimed the child king. Soon after this he set out to travel in foreign lands, conversing with sages and studying the laws of the countries he visited.

When he returned home, after many years, he found Sparta in a state of disorder and discontent. With the help of some of the leading citizens, who believed that an entire change of government was the only remedy, Lyeurgus made himself master of the city and drew up a new set of laws, designed so to govern the lives of the citizens as to build up a strong state (see Greece; Sparta).

Then obtaining a solemn promise from his fellow citizens that they would obey the laws and change none of them until his return, Lyeurgus again departed. Being told by the oracle at Delphi that the Spartans would enjoy everlasting prosperity as long as they did this, he decided never to return, in order that the Spartans might forever remain bound by their promise.

Lyeurgus is one of the great lawgivers of antiquity, and ranks with the legendary Manu of India, with Hammurabi of Babylonia, Moses among the Hebrews, and Solon of Athens.

LYNCHING. In the early days of the Great West of the United States, when cattlemen and miners were scattered over a huge wild country where policemen and courts were unknown, there were two famous characters who helped to maintain order—"Colonel Colt" and "Judge Lynch." Colonel Colt was the revolver that every man carried for his protection, and Judge Lynch was the rope that was used surely and swiftly to hang those who broke the written or unwritten law of the frontier.

Lynching, which means the summary punishment of suspected criminals by private individuals and without a regular trial, was almost a necessity in those days, for effective government organization for the punishment of "bad men" had not caught up

with the spread of population. Vigilance committees of citizens, called *vigilantes*, enforced the law in the early western gold fields. Lynching is no longer justified. Today it is usually the work of brutal and bloodthirsty mobs seeking vengeance for some exceptionally savage crime that should be punished by the courts. Negroes have been the chief victims of these lawless outbreaks, and in most cases it has proved almost impossible to convict persons who have taken part in these outrages, as public opinion in the communities is often so debased that no juries will find them guilty. Under the Federal Constitution, the national government is almost powerless to check the brutal practise of lynching. Administration of criminal law is chiefly a state responsibility, and it is the duty of the states to punish those guilty of taking part in a lynching within their respective boundaries. There have been numerous proposals for federal legislation against lynching, but none has had the approval of Congress. Despite the lack of a federal enactment, however, killings by lynching decreased from a "high" of 231 in 1892 to only 4 in 1941. It is generally agreed that any legislative measure to stamp out lynching can be completely effective only when the presence of local public opinion in every quarter of the nation discourages the very idea of mob action against individuals.

The origin of the word "lynch" is uncertain. The most commonly accepted derivation is from the name of Charles Lynch, a Revolutionary-day Virginian who punished culprits by his own hand.

LYNN, Mass. From earliest colonial days, Lynn has been a shoemaking city. Situated on Massachusetts Bay, ten miles northeast of Boston, Lynn was founded in 1629 and incorporated as a town in 1631. One of its first enterprises was leather tanning, and shoemaking naturally followed. By 1700 Lynn made shoes for most of Boston. When shoemaking machinery was introduced in 1848, huge factories were built and Lynn became the shoe center of the nation. Half a century later, as the industry spread to other cities in search of cheaper labor, Lynn lost first place; but it still maintains high rank in the manufacture of women's and children's footwear. It has since added many new industries. The largest single industry is the manufacture of electrical equipment and electric lamps. Other manufactures include leather, boxes, medicines, and machine shop products. Among the places of recreation are the fine beach on Nahant Bay; Flax Pond, with bathing and boating; and Lynn Woods, a large natural park with a botanical garden. Population (1940 census), 98,123.

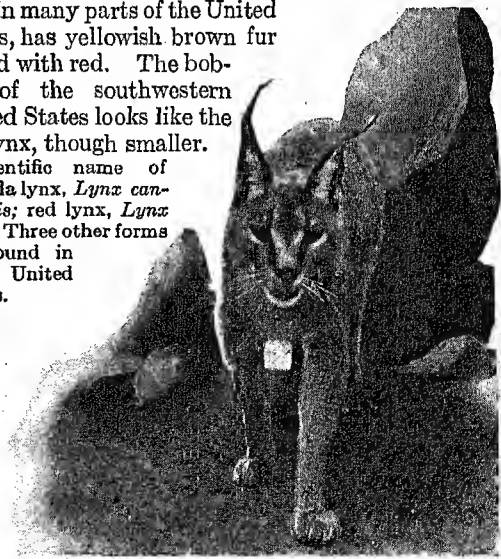
LYNX. So acute is the sight of the lynx that the ancients believed he could see even through a stone wall. That is why we still speak of sharp sighted people as "lynx-eyed."

This member of the cat family is found in the northern regions of both the New and the Old World. It is smaller than the leopard and larger than the true wildcat, which exists only in Europe. The name wildcat is, however, applied in America to various species of lynx. All have stumpy tails, long limbs, tufted ears, and eyes which contract in the daytime to a narrow slit. They live in forests and rocky places and are fond of resting stretched out on a tree limb in the sun. By night they hunt their food, which consists of birds and small animals. They often kill sheep and chickens.

The sudden cry of a lynx at night is one of the most frightful sounds known to woodsmen. Usually it consists of a single sharp howl, followed by silence. The reason for this is interesting. The creatures on which the animal preys, such as rabbits or quail, seek to escape his notice by lying perfectly still. The lynx, unable to distinguish their exact position, crouches down all ready for a leap, then emits his piercing cry. The timid victim, startled out of its wits by the fearful sound, cannot help jumping convulsively. At that instant, the lynx strikes.

The Canada lynx has heavy gray fur mottled with brown, and great numbers of these pelts are exported from Alaska and Canada. The red or bay lynx, common in many parts of the United States, has yellowish brown fur tinged with red. The bobcat of the southwestern United States looks like the red lynx, though smaller.

Scientific name of Canada lynx, *Lynx canadensis*; red lynx, *Lynx rufus*. Three other forms are found in the United States.



This is a Caracal, a member of the Lynx family. He inhabits portions of Africa and Southern Asia. You would know he was a Lynx by those long tufts on his ears.

THE EYES OF THE LYNX



The lynx, like the owl, looks dull-eyed during the daytime. This is because his eyes have unusually large pupils for night service and he must keep the "blinds" closely drawn in the daytime, to keep the sunlight from paining him.

LYONS (*l'ónz*), FRANCE. The third largest city of France, Lyons (which the French spell Lyon and pronounce *lè-on'*), is one of the most important silk centers of the world. It is built where two great rivers, the Rhône and the Saône, meet. The heart of the city lies on a point of land between the two rivers, but it extends back along their banks. The rivers are bordered by quays, and fine bridges connect the different parts of the city.

The silk industry was introduced into Lyons in the 15th century. Although many other industries have sprung up since then, the manufacture of silk, both artificial and pure, is still Lyons' major industry. The shimmering silks manufactured here and in the neighboring villages are used all over the world, and the weaving of them keeps thousands of hand and power looms humming. Hand looms are used for the richest and most elaborately wrought stuffs, and many of the skilled weavers belong to families which have for centuries handed the trade down from one generation to the next. Other important manufactures are iron, steel, and copper products, gold and silver products, chemicals, dyes, wine, and cheese.

Each spring a great international fair is held in Lyons. Almost every branch of industry is represented and exhibitors from many different countries attend it. The city has been a trading center since Roman days and during the Middle Ages its fairs were famous.

Lyons has a university with schools of law, science, medicine, and pharmacy; a school of fine arts where the persons who make the designs for the silks are trained; and other schools and colleges. There are also many beautiful new and old buildings—cathedrals, monasteries, a municipal library, art galleries, and hotels. Roman remains are found in certain parts of the city.

Lyons is one of the most strongly fortified cities in France, with a double ring of forts about it. The town was founded by the Romans before the Christian era, and was the starting point of four great highways built

by the Emperor Agrippa. Augustus made it the capital of Celtic Gaul and built aqueducts, temples, and a theater. Later it was ravaged by the barbarians and abandoned by the Empire. Late in the 5th century it was made the capital of the Burgundians, and in 1312 it became a part of France. Two famous church councils were held here. During the Middle Ages several uprisings took place and the town was badly damaged. But Napoleon rebuilt and improved it, and since his day it has been one of the greatest sources of the wealth of France. Population, about 570,000.

LYRE-BIRD. The bird whose tail has "made him famous" is the lyre-bird of Australia. Without the 16 long and curiously shaped tail feathers of the male, this bird is not at all unusual, for both male and female are of unattractive form, about the size of a grouse, and of a sooty-brown color with a few markings of red. These tail feathers are about two feet long, generally drooping like a peacock's train, but when raised and spread they take the shape of the Apollo's lyre. The tail does not reach perfection until the birds are three or four years old. It is shed in the fall and renewed each spring. The male bird is very proud of his fine feathers and one of his curious habits is that of scratching together little mounds of soil and leaves upon which he stands, spreading his tail, drooping his wings, and calling to his mate to admire him (for illustration in colors see *Paradise Birds*).

The lyre-bird is the largest of the singing birds. He has a mellow liquid note, and is said to imitate the songs of other birds and even animals. The nest is placed on the ground, at the foot of a tree or rock, and is closely woven of fine strong roots and lined with feathers. About this nest is heaped an oven-shaped mass of sticks, moss, and leaves, with a side entrance so that the inner nest and the one egg are entirely protected. The birds are very shy, and when molested escape by running rapidly in the underbrush. They are found at times in the trees, but they are not good flyers. Scientific name of the best known species, *Menura superba*.



THE EASY REFERENCE FACT-INDEX

GUIDE TO ALL VOLUMES FOR SUBJECTS
BEGINNING WITH

K-L

TO SAVE TIME

USE THIS INDEX 

EDITOR'S NOTE ON NEXT PAGE TELLS WHY

SPECIAL LISTS AND TABLES

THE WORLD'S LARGEST LAKES	247
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Numerous other lists and tables in the fields of geography, history, literature, science, mathematics, and other departments of knowledge will be found with their appropriate articles in the main text

EDITOR'S NOTE

EVERY user of Compton's Pictured Encyclopedia should form the habit of *first* turning to the Fact-Index section at the end of each volume when in search of specific information. This index is a miniature work of reference in itself and will often give you directly the facts, dates, or definitions you seek. Even when you want full treatment of a subject, you will usually save time by finding in the index the exact page numbers for the desired material.

All page numbers are preceded by a letter of the alphabet, as A-23. The letter indicates the volume. If two or three page numbers are given for the topic you are seeking, the first indicates the more general and important treatment; the second and third point to additional information on other pages. Where necessary, subheadings follow the entry and tell you by guide words or phrases where the various aspects of the subject are treated.

The arrangement of subheadings is alphabetical, except in major historical and biographical entries. In these the chronological order is followed.

The pictures illustrating a specific subject as a rule appear on the same pages as the text to which you are referred. But often illustrations placed elsewhere will prove of additional interest and value. These are indicated by the word *picture* followed by a page number.

A picture reference is frequently intended to call attention to details in the text under the illustration as well as to the illustration itself. This picture-text, therefore, should always be carefully read.

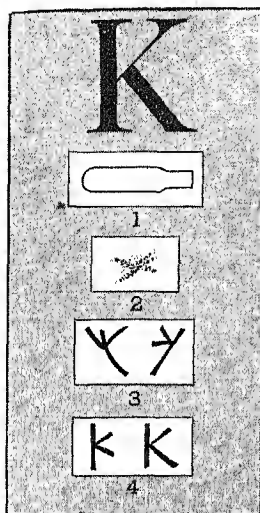
The pronunciations given are those preferred by the best and most recent authorities; alternative pronunciations are indicated only where usage is equally divided. For foreign names the native pronunciation is given except where the English pronunciation has become thoroughly established, as in "Paris," "Barcelona," "Seine."

In recent years hundreds of foreign geographical names have been changed, either officially or by custom. Both old and new names are given at the appropriate places in the alphabet.

Populations are given in round numbers, except for places in the United States and Canada, where the figures are those of the latest official census. Distances between points are map or air distances, not distances by railroad.

THE EASY REFERENCE FACT-INDEX

Reg. U. S. Pat. Off.



OUR LETTER K probably started in Egyptian writing as a picture of the palm of a hand (1). To the Egyptians, this picture stood for the corresponding word; but soon after 2000 B.C., a Semitic people called the Seirites used the picture as an alphabetic sign for the sound of 'k'. Apparently they did this because their name *kaph* for 'the palm' began with this sound.

The surviving Seirite inscriptions have been so badly weathered that the sign is almost illegible, but it suggests a rude cross (2). When the Phoenicians and other Canaanites adopted this alphabet, for a time they used lines to suggest a wrist and fingers; but, as time passed, the sign lost all resemblance to a hand (3). The name remained *kaph* in Hebrew and other Semitic languages. The sign was always shaped to suit writing from right to left in Semitic fashion.

After the Greeks learned to write from the Phoenicians, they simplified the sign and turned it around for writing from left to right (4). They also renamed it *kappa*. The Romans took it without change into Latin, and from Latin it came to us.

Our handwritten 'k' is simply a capital K, with small, easily made diagonal strokes; our printed small 'k' imitates the handwritten one.

NOTE.—For the story of how alphabetic writing began and developed, see the articles Alphabet; Writing.

K 2, Mount. See in *Index* Godwin-Austen

Kaaba (*kā'ā-bā* or *kā'bā*), Kaba, or Kaaba, Mohammedan shrine at Mecca M-103, picture M-102

Kab'bala, or Cabala, mystical interpretation of Scriptures H-267

Kabln'da, or Cabinda, Portuguese territory in Africa, administered by colony of Angola C-332, map C-331

Kabul (*kā-būl'*), Afghanistan, capital and largest city; in province of Kabul; key to n. India; pop. 80,000; A-30-1, map A-31

Kabyles (*kā-bīl's*), Berber tribes of Algeria A-39, A-125

Kachina (*kā-oh'sh'nā*), Indian name for spirit of an ancestor, also a portrayal of the spirit: A-293, I-61

Kachin Hills, in Burma B-278a

Kachins, a marauding people of Indo-Chinese origin living along border of upper Burma B-278a

Kadi (*kā'dī*), or cadi, name given by Mohammedans to a judge or magistrate.

Kadlak Island. See in *Index* Kodlak

Kadin (*kā-dēn'*), in harem T-103

Kaf'ir corn, or taffir corn, a variety of sorghum K-1, picture S-194

Kafirs (*kā'fīr's*), or Kaffirs, in Afghanistan, an Aryan people A-29

Kafirs, or Kaffirs, in South Africa, a loosely defined group of Bantu tribes S-200, A-38

Kafirs, or Kaffirs, in South Africa, a loosely defined group of Bantu tribes S-200, A-38

Kaga'wa, Toyohiko (born 1888), Japanese preacher and social reformer; converted to Christianity at 14; author of poetry, essays, children's stories, novels

Kagera (*kā-gā'rā*) River, Africa A-38

Kagoshima (*kā-gōsh'i-mā*), Japan, one of chief cities of Kyushu Island; pop. 190,000; home of cracked Satsuma ware: map J-186

Kahn, Otto Hermann (1867-1934), American banker and patron of music and art, born Mannheim, Germany; came to U. S. 1893; member firm Kuhn, Loeb & Co., N. Y. City, after 1897 ('Of Many Things')

Kahoolawe (*kā-hū-lū'wā*), small

island of Hawaiian group; 44 sq. mi.; mostly barren; only one permanent resident listed in 1940 census; maps H-242, 243

Kalbab National Forest, in Arizona, adjoining Grand Canyon National Park on n.; 723,731 acres; forest headquarters Kanab, Utah

Kaleteur (*kā-tē-tūr'*) Falls, in British Gulana, picture S-206b

Kalfeng (*kā-fūng'*), China, capital of Honan province, 450 mi. s. of Peking; pop. 200,000; remnants of 12th century colony of Jews; map C-212

Kalgani. See in *Index* Haida

Kallas (*kā-lās'*), temple at Ellora, India H-365

Kallyard (*kā'l'yārd*) (meaning kitchen, or cabbage, garden) school, term applied to group of Scottish novelists who wrote of life of common people with copious use of dialect; best represented by Ian MacLaren and Sir James M. Barrie.

Kalnite, a mineral salt M-183

Kalrouan (*kā-rū-wān'*), also Kalrwan Tunisia, sacred city of Mohammedans; has beautiful Ukbah mosque, rebuilt in 827; pop. 23,000.

Kalsaria, Turkey. See Kayseri

Kaiser (*kā'zēr*), official title of German and Holy Roman emperors origin C-13

Kaiser, Georg (born 1878), German dramatist and critic; a leader of expressionist school; his plays focus on social problems ('Gas'; 'From Morn to Midnight'; 'The Coral').

Kaiser, Henry J. (born 1882), industrialist, born Canajoharie, N.Y.; noted as builder of Boulder, Grand Coulee, and Bonneville dams; also a bridge and ship builder; advanced plan in 1942 for mass production of cargo planes: picture N-121

Kaiserslautern (*kā'zērs-lou-tēr'n*), Germany, industrial city in Bavaria 35 mi. w. of Mannheim; pop. 63,000; Frederick Barbarossa built castle here about 1152.

Kaiser Wilhelm's Land, now Mandated Territory of New Guinea N-85

Kaizaks. See in *Index* Kazaks

Kajar, dynasty of Persia, founded by Aga Mohammed P-134

Kala-azar (*kā'lā ā-zār'*), a fatal malaria-like fever common in certain parts of India, transmitted by the bite of a sand fly G-78

Kalabits, a tribe of natives in Borneo, known as good farmers and metal workers.

Kalah, also Nimrud, ancient Assyrian city, near Nineveh, built 1800 B.C. by Shalmaneser I; abandoned, then rebuilt as royal residence city about 880 B.C.; excavations revealed much monumental material: N-146

Kalahari (*kā-lā-hā'rē*) Desert, South Africa, chiefly in Bechuanaland; about 240,000 sq. mi.: A-38, maps S-202, A-42a, b

Bushman S-200, E-346, picture E-344 crossed by Livingstone A-40

Kalakaau (*kā-lū-kou'ū*), David (1836-91), king of Hawaii, whose disorderly reign (1874-91) followed by that of his sister, Queen Liliuokalani, led to the annexation of Hawaii by the United States 1898.

Kalamazoo, Mich., industrial city in s.w. on Kalamazoo River, about 40 mi. e. of Lake Michigan; pop. 54,007; celery growing; stores, automobiles, paper; state teachers college, Kalamazoo College: map M-153

Kalamazoo Case, The, in history of education. Citizens of Kalamazoo, Mich., challenged (1872) the collection of taxes for the support of a public high school. The Michigan Supreme Court decided (1874) that the state had the right to levy taxes for support of a complete system of public education, including high schools and universities. The case set a precedent for other states.

Kalamazoo College, at Kalamazoo, Mich.; Baptist; chartered 1833 as Michigan and Huron Institute, as college 1855; arts and sciences.

Kalapooia. See in *Index* Calapooia

Kalapooian Family, a group of Indian tribes that formerly lived in the valley of Willamette River, n.w. Oregon, and spoke a distinct stock language.

Kalat (*kā-lāt'*), or Khelat, capital of native state of Kalat in Baluchistan; pop. 18,000; trade center, rap-

id growth since 1900: *maps* I-30, A-332c
Kalb, Baron de. *See in Index* De Kalb
Kale, vegetable of mustard family C-1
Kaleidoscope (*ká-lí-dō-skōp*) K-1
Kalends, or Calends, in Roman calendar C-22
'Kalevala' (*ká-lá-vá-lá*), ancient Finnish epic F-44, S-303d
Kall (*ká-lē*). *See in Index* Devi
Kalidasa (*ká-lē-dú-sá*) (3d century A.D.?), greatest dramatic and lyric poet of India and one of great world poets ('Sakuntala')
Kallinai (*ká-lē-náin*), Michael I. (born 1875), Russian statesman; a peasant himself, regarded as representative of peasants in Soviet government in which he became president of central executive committee 1919, and chairman 1923; elected chairman of Supreme Soviet of the U.S.S.R. 1938.
Kallinai (*ká-lē-nén*), formerly Tver, U.S.S.R., cotton-manufacturing and trade center, on Volga River, 100 mi. n.w. of Moscow; pop. 215,000; cap. of independent principality 18th to 15th centuries; *map* E-326e
Kallispell, Mont., town 152 mi. n.w. of Helena; pop. 8245; seat of Flathead County; settled 1881; lumbering and agriculture; *map* M-243
Kallum, Latin and chemical term for potassium. *See in Index* Potassium
Kalix River, Sweden, flows s.e. 208 mi. to Gulf of Bothnia, *map* N-173
Kallikak, fictitious name of a two-branch family dating from Revolutionary War days, investigated by H. H. Goddard in his studies of heredity. Of 480 descendants of a feeble-minded mother and a sound father 282 were mental, moral, or physical defectives; all were below normal in intelligence. Of 496 descendants of the same father and a mother of good stock only 4 were in any way defective; all were of sound mentality.
Kallima butterfly, also dead leaf, Indian leaf, or oriental leaf, butterfly F-354, *pictures* P-355, I-85
Kalmar, formerly Calmar, Sweden, port and cathedral town 200 mi. s. of Stockholm; pop. 20,000; historic castle dating from 12th century; *map* N-173
Kalmar, Union of (1897) D-53
Kalmia, genus of plants of the heath family, best-known species being mountain laurel (*Kalmia latifolia*)
Kalmucks, branch of Mongols M-224
Kalmus, Herbert Thomas (born 1881), chemical engineer, born Chelsea, Mass.; director Research Laboratory of Electro-chemistry and Metallurgy, Canadian government 1918-15; invented technicolor in motion pictures.
Kal'somine, or calcimine P-32a-b
Kalthoeber, Charles, one of the best of the colony of German bookbinders who lived in London at end of 18th century; influenced by Roger Payne, but his distinctive style recognizable by ornaments in the panels of the back; most of his bindings bear his label.
Kamakura (*ká-má-kú-rá*), Japan, seacoast village near Yokohama, long center of feudal government
Great Buddha J-200, *picture* J-202
Kama (*ká-má*) River, in e. Russia, largest tributary of Volga River; over 1000 mi. long; timber trade; *map* E-326a

Kamchatka (*kám-chát-ká*, Russian, *kám-chát-ká*), peninsula of e. Siberia; nearly 105,000 sq. mi.; pop. about 30,000; K-1, *map* A-332b
Kamehameha (*ká-má-há-má-há*) I (1753-1819), Hawaiian king; encouraged European commerce H-245
 birthday celebrated H-321
Kamel (or Camel), George Joseph (1661-1706), Moravian botanist. Jesuit missionary to Philippines camellia named for C-39
Kamenev (*kám-én-yéf*), Leo B. (1883-1936), Russian politician; member central committee of Communist party during 1917 Revolution; expelled from Communist party 1927 for opposition to Stalin and support of Trotsky; readmitted 1928; executed in 1936 for part in plot to overthrow Stalin régime.
Kamerun. *See in Index* Cameroons
Kamimura (*ká-mé-mú-rá*), Hikonojo, Baron (1849-1916), Japanese admiral; notable victory over Russian cruiser squadron off coast of Korea in Russo-Japanese War; made baron 1907 and admiral 1910.
Kamloops, British Columbia, a railroad city on Thompson River about 160 mi. n.e. of Vancouver; pop. 6167; mining, fruit-growing, ranching, and hunting district; *map* C-50b
Kampala (*kám-pá-lá*), native cap. and commercial center, Uganda, East Africa; airport; pop. 5000; E-139
Kampen (*kám-pén*), Netherlands, town near mouth of river Yssel; pop. 20,000; formerly a Hanseatic town; 14th century town hall and church.
Kanak's, natives of Polynesia P-4-5, *pictures* P-5, H-241
Kanawha (*ká-nó-wá*) River, in West Virginia; formed in w.-cent. part of state by junction of New and Meadow rivers; flows n.w. and joins Ohio River at Point Pleasant; length about 450 mi.; Little Kanawha rises in cent. West Virginia and flows w. and n.w. about 100 mi. into Ohio River at Parkersburg; *map* W-76
Kanazawa (*ká-ná-zá-wá*), Japan, city on w. coast of Honshu Island; pop. 195,000; noted for bronze and lacquer work, pottery, silk; fine public gardens; *map* J-186
Kanchanjanga, Mount. *See in Index* Kinchinjanga, Mount
Kandahar (*kám-dá-hár*), also Qandahar; trade center in province of Kandahar, Afghanistan, 300 mi. s.w. of Kabul; pop. 60,000; captured by Genghis Khan, Timur, and others; prominent in wars between British and Afghans; *map* A-31
 relief by Roberts R-117
Kandla'sky, Wassily (born 1866), Russian painter, identified with German modern movement; one of leaders in non-objective painting; author of 'The Art of Spiritual Harmony'.
Kandy (*kán-dí*), Ceylon, highland town in center of island on artificial lake; pop. 37,000; cap. of former native kingdom of Kandy; Buddhist and Brahman temples; *map* I-30
Kane, Elisha Kent (1820-57), American Arctic explorer and scientist, born Philadelphia; accompanied and commanded 2d Grinnell expedition; attained Kane Basin (1853) and the then farthest North.
K'ang (*káng*), a Chinese bed C-215
Kangaroo K-1-2
 foot K-1, *pictures* F-147, K-2

fossil remains K-2, *picture* A-372
 found only in Australia A-372
 skeleton, *picture* S-155
Kangaroo rat, an American rodent with kangaroo-like hind legs R-51, 52
K'ang Hsi (*káng shé*), or K'ang Hsi (1655-1722), Chinese emperor (1662-1722); encouraged arts and literature; consolidated empire; used foreigners to take census and revise calendar
 pottery of period, *picture* P-333, color plate facing C-221g
Kang-teh. *See in Index* Pu-yi
Kankakee, Ill., city 50 mi. s. of Chicago; pop. 22,241; agricultural implements, pianos, stoves, boilers; institute for insane; St. Viator College, Roman Catholic divinity school, in suburb; *map* I-13
Kankakee River, rises in n.w. Indiana and flows s.w. into Illinois; headstream of Illinois River.
Kansa, or Kaw, a Siouan Indian tribe formerly living along Kansas River, now in Oklahoma.
Kansas, a central state of U.S.; 82,276 sq. mi.; pop. 1,801,028; cap. Topeka: K-3-8, *maps* K-4, U-188b-o
 agriculture K-3-5; wheat K-4
 bird, state B-122
 cities K-5, list K-3. *See also in Index* names of cities
 climate K-3; cyclones S-298
 flag F-91, color plate F-87
 flower, state S-279
 forests, state, table F-250
 history K-6; Oregon and Santa Fe trails F-15; Kansas-Nebraska Act K-7; slavery B-256, B-250; cattle ranges and trails C-115, W-97
 legislative experiments K-5-6
 manufactures K-5, K-6, W-97
 minerals K-5
 name, origin of, and nickname S-279
 natural features K-3
 products, chart K-3, list K-3
 transportation W-97
Kansas, University of, at Lawrence, Kan.; state institution; founded 1866; arts and sciences, engineering, music, law, pharmacy, medicine, business education, graduate school; *picture* K-6
Kansas City, Kan., largest city in state; pop. 121,458; slaughtering and meat-packing center: K-6, *map* K-4
Kansas City, Mo., 2d city of state; pop. 399,178; slaughtering and meat-packing center: K-6-7, *map* M-208
 government M-302
 Kersey Coates Drive, *picture* M-210
Kansas gayfeather. *See* Gayfeather
Kansas ice sheet I-2b
Kansas-Nebraska Act (1854) K-7
 Douglas and D-87
 Lincoln opposes L-142
 Sumner opposes S-326
Kansas River, Kan., formed by junction of Big Blue and Smoky Hill rivers; with Smoky Hill, traverses entire state to Missouri River; *map* K-4
Kansas State College of Agriculture and Applied Science, Manhattan, Kan.; established 1863; agriculture, veterinary medicine, engineering, architecture, home economics, general science, chemistry, journalism, commerce, music, physical education.
Kan'su, northwesternmost province of China proper; 145,968 sq. mi.; pop. 8,705,000; cap. Lanchow; dyes, gold, mercury, silks, musk, tobacco; *map* C-212
Kant (*kánt*), Immanuel (1724-1804),

Key—cápe, át, fár, fást, whát, fáll; mé, yót, fén, thére; íce, bít; rów, wón, fór, nót, dq; cáre, bú, ryde, full, búrn;

German philosopher; founder of "transcendental" or "critical" philosophy; prof. University of Königsberg ('Critique of Pure Reason') literary influence G-63 political theories P-294

Kantara, or El Qantara, town in Egypt, where Cairo-Palestine railroad crosses Suez Canal, map A-242

Kantor, MacKintay (born 1904), American novelist, short-story writer, and poet, born Webster City, Iowa; ('Turkey in the Straw', verse; 'Voice of Bugle Ann'; 'Noise of Their Wings').

Kantor, Morris (born 1896), painter and teacher of painting, born Russia; removed to United States in youth; exact draftsman, keen sense of plastic form, bold color.

Kaoliang (*kā-lā-āng'* or *kow'ā-āng'*), a grain sorghum M-61, picture M-50

Kaolin (*kā'ō-lin*), or china clay, clay used in china and porcelain C-261 chemical composition M-184

how worked, pictures N-157, S-213 pottery C-261, P-327, 328, 330

Kapok (*kā'pōk*) K-7-8, pictures K-8, E-142d

cellulose source, chart C-123 Guatemala produces G-181o

Kapp (*kāp*), Dr. Wolfgang von (1868-1922), German monarchist, leader of revolt which for a few days in March 1920 put to flight Ebert government; fled to Sweden; arrested for treason on return to Germany 1922; died before trial.

Kappel, or Cappel, Switzerland, village in canton of Zurich Zwingli slain in battle Z-232

Kapu Dagh (*kā'pū dāg*). See in Index Cyzeus

Kara'chi, port and railroad center, cap. of province of Sind, at w. end of Indus delta in n.w. India; pop. 265,000; "gateway of central Asia"; manufactures, fisheries; maps I-30, A-332c

Karafuto (*kā-rā-fū'tō*). See in Index Sakhalin

Kara-George ("Black George") (1766?-1817), nickname given by Turks to George Petrovitch, or George Czerny, Serbian peasant, leader of first Serbian war of independence (1804-08) and founder of Kara-Georgevitch dynasty: S-81

Karađich (*kā-rā'djich*), Vuk Stefanovich (1787-1804), Serbian writer, called father of modern Serbian literature; bent efforts toward adoption of Serbian mother tongue as literary language; published folk-songs of the common people; wrote Serbian grammar and dictionary.

Kara Kirghiz, or Black Kirghiz, so called from color of their tents; Mongolian people inhabiting highlands of central Asia.

Karakoram (*kā-rū-kō-rām'*) Range, or Kara Korum, mountain range in great plateau of central Asia between Cashmere and Sinkiang; continuation of the Hindu Kush; separated from the Himalaya Mts. by the Indus River; highest peak, Mt. Godwin-Austen (28,250 ft.).

Karakorumor, Mount. See in Index Godwin-Austen

Karakul (*kār-ū-kul'*), or caracul, a breed of sheep S-106

Karamzin (*kā-rām-zēn'*), Nikolai Mikhailovich (1766-1826), Russian historian, novelist, and critic; most famous work is his popular 'History of Russia'; also wrote 'Poor Liza' and 'Martha the Viceroy',

novels; 'Letters of a Russian Traveler'; and compiled 'The Pantheon of Foreign Literature' and 'The Pantheon of Russian Literature'.

Karankawa (*kā-rān'kā-wā*), an Indian tribe, forming a linguistic stock, formerly living on the Texas coast, but now extinct.

Kara (*kā'rā*) Sea, also Karskoe, arm of Arctic Ocean between Nova Zembla and n.w. coast of Siberia. map A-332b

Kara Strait, at w. entrance to Kara Sea.

Karat, a measure of weight. See in Index Carat

Kar'ala, or Kerbela, Iraq, town 60 mi. s.w. of Baghdad; pop. 50,000; sacred city and place of pilgrimage of Shiite Moslems; tomb of martyr Hussein: map A-332b

Karelian Isthmus, land between Lake Ladoga and the Gulf of Finland; included in the Karelo-Finnish Soviet Socialist Republic, U.S.S.R.

Karelo-Finnish Soviet Socialist Republic, 12th constituent republic of the U.S.S.R., created in 1940 by combining Karelian Autonomous Soviet Socialist Republic with territory won from Finland; about 72,000 sq. mi.; pop. 470,000: R-194b

Karens (*kā-rānz'*), a people of Burma B-278a

Karfiel, Bernard (born 1886), American figure and landscape painter, born Budapest, Hungary; vigorous, simple design, sculptural feeling for forms.

Karikal (*kā-rō-kāl'*), French India, colony on s.e. coast of India; 52 sq. mi.; pop. 63,000; chief town Karikal (pop. 17,000): I-43, map I-31

Karlfeldt (*kār'fēlt*), Erik Axel (1864-1931), Swedish poet; wrote of life of peasants in Dalecarlia, his native region; awarded Nobel prize, 1931, posthumously.

Karlowitz (*kār'lō-wits*), or Carlowitz, Yugoslavia, modern Srijemski Karlovec, town on Danube River, 40 mi. n.w. of Belgrade; peace between Turkey, Austria, Poland, Venice, and Russia signed here (1699).

Karlsbad (*kār'lsbāt*), or Carlsbad, Germany, famous watering place about 150 mi. s. of Berlin; pop. 24,000; ceded by Czechoslovakia to Germany 1938. Karlsbad decrees issued here at conference of German states (1819) enforced strict censorship to suppress liberal agitation.

Karlsefni (*kār'lēf'nē*), Thorfinn (*thōr'fīn*), Norse navigator of the 11th century N-168

Karlskrona (*kār'lskrō'nā*), Sweden, or Carlscrona, port on Baltic Sea, 238 mi. s.w. of Stockholm; pop. 26,000; Swedish naval headquarters, arsenals, shipyards; exports fish, stone, iron, lumber.

Karlsruhe (*kār'lsrū-ē*), Germany, formerly Carlsruhe, cap. of state of Baden, 39 mi. n.w. of Stuttgart; pop. 160,000; locomotives, machinery, wagons: map G-66

Kar'ma, in Hinduism H-293

Karnak (*kār-nāk'*), village on Nile in Upper Egypt on n. part of site of ancient Thebes; remains of Temple of Ammon, greatest of all known temples: E-208, C-17, pictures E-205, 208, 209, color plate A-260a, map E-197

Karnak, Ruins of, in Mammoth Cave, Ky., picture C-117

Kärnten (*kār'n'tēn*), Germany. See in Index Carinthia

Karok, an Indian tribe that lived on Klamath River, n.w. California.

Karolyi (*kā'rō-yē*), Count Michael (1875-1934), Hungarian statesman, born Budapest; although from wealthy family was early influenced by Marxian socialism; president of Hungarian Republic 1919; resigned upon Bolshevik seizure of government and thereafter lived in exile ('The Struggle for Peace').

Karoo', or karroo, barren tableland in South Africa S-199

Kars, town in n.e. Turkey about 110 mi. n.e. of Erzurum; pop. 18,000; Mohammedan holy city, with 11th-century Cathedral of the 12 Apostles; cap. of a medieval Armenian principality; several times besieged in wars between Russia and Turks: map B-154

railroad connection C-116

Karshi, U.S.S.R. See in Index Bek-Budl

Karskoe Sea. See in Index Kara Sea

Karun (*kā-rūn'*) River, only navigable river in Persia; rises in western mountains and flows into the Shatt-el-Arab; 400-500 mi. long.

Kasbek, Mount. See in Index Kazbek, Mount

Kashan. See in Index Kassa

Kashgar (*kāsh-gār'*), also Shufu (formerly Cashgar), commercial center in w. Chinese Turkestan, 100 mi. n.w. of Soche; pop. 80,000; textiles; gold and silver articles: map A-332b

bazaars A-328

Kashmir (*kāsh'mēr*), or Cashmere, also called Jammu and Kashmir, mountainous state in n. India; 84,516 sq. mi.; pop. 3,645,000: K-8, map I-81

brass work, picture C-381

Jehlam River, picture R-110

silkworm cocoons, picture T-70

Kaskas'kla, tribe of Indians of Algonquian family, one of leading tribes of Illinois confederacy (See in Index Illinois Indians); remnants of tribe removed to Indian Territory in 1867.

Kaskaskia, Ill., early French settlement in s.w. on Mississippi River (1700); pop. 131

capital of Illinois Territory (1809-20) I-18

George Rogers Clark captures C-259, picture U-237

Indian mission A-156

Kaskaskia River, in s. Illinois; about 300 mi. long; enters Mississippi at Chester: map I-13

Kasperl, or Hans Wurst, German puppet P-368b

Kassa (*kāsh'shō*), Czech Košice (*kō-shē-tse*), German Kaschau (*kā-shōu*), city in n. Hungary; pop. 70,000, mostly Magyars and descendants of Germans who founded city before 12th century; ceded to Czechoslovakia after 1st World War; returned to Hungary 1938; wool center; 14th century Gothic cathedral; mineral springs near by: maps E-326c, C-422

Kassai (*kā-sī'*) River, rises in n.e. Angola and flows n.w. 1000 mi. to Congo River, map C-331

Kas'sel, Germany. See in Index Cassel

Kassites (*kā-sits'*), Elamite tribe which overran Babylonia and founded dynasty (1780-1200? B.C.).

Kat (*kāt*), also khat, or catfa (*Catha edulis*), evergreen shrub with clusters of small white flowers, native to Arabia and Egypt; leaves used to make stimulating beverage and are also chewed by natives.

- Katabolism** (*ká-táb'6-lizm*). See in *Index* Catabolism
- Katadlin** (*ká-tá'dín*), Mount (Indian "big mountain"), bare granite peak in e. Maine, highest point in state (5268 ft.); state park: map M-38
- Katanga** (*ká-tán'gá*), district in southernmost part of Congo State; pop., white 5000, native 800,000; rich in copper, coal, tin, gold, and radium ores
- copper mining C-357, 359
radium deposits R-35
- Ka'ter, Henry** (1777-1835), English physicist, born Bristol; in English army 1794-1814, after which devoted entire time to science; invented floating collimator; determined length of seconds pendulum; constructed standards of weights and measures for Russia.
- Katherine**, or **Catherine**, of Valois (*vál'vó'*) (1401-37), daughter of Charles VI of France and queen of Henry V of England H-358
- Katherine**, or **Katharina**, "the shrew" in Shakespeare's 'Taming of the Shrew'
- Katnal** (*kát'mí*), Mount, volcano of Aleutian Range in n. of Alaskan Peninsula; height 7500 ft.: A-101
- Katnal National Monument**, Alaska N-22a-b, map A-105, picture N-18
- Katmandu** (*kát-mán-dá'*), also **Khatmandu**, cap. of Nepal, at junction of Bagmati and Vishnumati rivers, about 150 mi. n. of Patna, India; pop. 80,000: maps A-332c, I-30
- Kato** (*ká'tó*), **Takakiri**, Viscount (1850-1926), Japanese statesman, ambassador to Great Britain 1894-98, 1908-1913; four times foreign minister; leader of the Constitutional party.
- Kato, Tomosaburo**, Baron (1859-1923), Japanese admiral and statesman; commanded fleet which attacked Germans at Tsingtao in 1914; delegate to Washington Limitation of Armament Conference 1921; premier 1922.
- Katowice** (*kát-6-vát'sá*), (German **Kattowitz**), city of Poland, 165 mi. s.w. of Warsaw, near German border; iron works, foundries; in important zinc and anthracite district; pop. 130,000: map E-326d-e
- Katrine**, Loch, lake near Glasgow, Scotland; 5 sq. mi.; immortalized by Scott in 'Lady of the Lake'.
- Katsura** (*kát'sú-rá*), **Taro**, Prince (1847-1913), Japanese statesman, governor of Formosa, minister of war, then premier 1901-06; again premier 1908-11 and 1912-13; accomplished commercial and financial reforms, annexation of Korea.
- Kattégat**, strait between Denmark and Sweden; 150 mi. long, greatest width 90 mi.: map D-53
- Kattowitz**, Poland. See in *Index* Katowice
- Katydid**, green insect of the grasshopper family K-8-9
- Katzbach** (*kát'sbák*) River, tributary of Oder in Prussian Silesia; on its banks Prussians under Büchler defeated French under Marshal MacDonald (1813).
- Kaul** (*ká-q-á'*), one of Hawaiian Islands, 547 sq. mi.; pop. 35,636; H-242-3, maps H-242, 243
- Kauffman**, **Reginald Wright** (born 1877), American writer; born Columbus, Pa.; 1st World War correspondent and contributor of verse, fiction, and essays to periodicals; author of historical and sociological novels ('Spanish Dollars', 'Overland Trail', 'House of Bondage').
- Kauffmann** (*kou'fmán*), **Angelica** (1741-1807), Swiss portrait painter, whose beauty and charming personality enhanced the reputation of her graceful but poorly drawn pictures; friend of Goethe, Reynolds, and other famous men work with Adam brothers I-104
- Kaufman**, **George S.** (born 1889), American playwright, born Pittsburgh, Pa.; began as newspaper man, travelling salesman. With **Mare Connelly** wrote 'Dulcy', 'Merton of the Movies', 'Beggars on Horseback'; with **Edna Ferber** 'Royal Family', 'Dinner at Eight'; with **Morris Ryskind** 'Of Thee I Sing' (Pulitzer prize 1932); with **Moss Hart** 'You Can't Take It with You' (Pulitzer prize 1937).
- Kaulbach** (*kou'fák*), **Wilhelm von** (1805-74), German fresco and historical painter and book illustrator, first and most celebrated of a family of painters; illustrated 'Reynard the Fox' painting, picture R-66
- Kaulfussia**. See in *Index* Charieis
- Kavmas** (*kou'vás*), also **Kavno**, trade center in central Lithuania on Niemen River; pop. 110,000, large Jewish element; temporary cap. during Wilno dispute; university opened in 1922; manufactures wire, nails.
- Kaunitz** (*kou'nits*), **Prince Wenzel Anton von** (1711-94), Austrian statesman, minister of Maria Theresa S-84
- Kauri** (*kou'ri*) gum, the resin, usually fossilized, of kauri pine, native of New Zealand G-188
- Kava** (*ká'vá*), or **ava**, name of a shrub and of an intoxicating drink prepared from its root; plant belongs to pepper family; native to Pacific Islands.
- Kavele**, Tanganyika Territory, Africa. See in *Index* Ujiji
- Kavkaz** (*káf-kás'*) Mountains. See in *Index* Caucasus
- Kaw**, or **Kansa**, a Siouan Indian tribe formerly living along Kansas River, now in Oklahoma.
- Kay, John** (1704-64), English inventor; invented flying shuttle 1733; device considered a menace to labor; was mobbed by weavers and model destroyed; resumed work in France where he died in poverty: I-74c, S-259
- Kay, Sir**, one of knights of Round Table R-160
- Kayak** (*kí'ák*), Eskimo canoe I-62, C-78, picture B-162
- Kayans** (*kí'áns*), a native tribe in Borneo, distinguished by industry, warlike qualities, and skill at hand crafts.
- Kaye-Smith**, **Shella** (*shé'á ká'smith*), English writer, one of most distinguished of contemporary women novelists; born St. Leonards-on-Sea; writes chiefly of country life in Sussex ('Sussex Gorse', 'Tamarisk Town', 'Joanna Godden', 'The Village Doctor', 'Susan Spray').
- Kayseri** (*kí-sé-ré'*), or **Kaisaria** (*kí-sá-ré'á*), Turkey, trade center in Asia Minor, 160 mi. s.e. of Ankara; pop. 46,000; exports carpets, hides, fruit; ancient Caesarea: maps A-332b, E-326c
- Kazaks** (*ká-záks'*) or **Kazaks**, Turkic people living in n.e. part of Aral-Caspian basin and closely connected with the Kirghiz.
- Kazakh Soviet Socialist Republic**, or **Kazakhstan**, constituent republic of the U. S. S. R., e. and n. of Caspian Sea and w. of Mongolia; area about 1,059,458 sq. mi.; pop. 6,145,000; cap. Alma-Ata: T-158
republic formed R-179
- Kazan** (*ká-sán'*), U. S. S. R., manufacturing and trade center, cap. of Tatar Republic, 450 mi. e. of Moscow; pop. 400,000; cap. of ancient Tatar kingdom, taken by Russians 1552; university: map E-328e
- Kazan defile**, on Danube River D-14
- Kaz'bek**, **Mount**, or **Kasbek**, **Mount**, one of highest peaks of Caucasus Mts. (16,545 ft.) 90 mi. s.e. of Mt. Elbruz.
- Kazvin** (*kás-vín'*), or **Kasvin**, town in Persia, 100 mi. n.w. of Teheran; pop. 60,000; trade in rice, fish, raisins, silk; remains of old buildings shattered by earthquakes: map A-332b
- Ke'a**, a sheep-killing parrot P-82
- Kean** (*kén*), **Charles J.** (1811-68), English actor, not so great as his father, **Edmund Kean**, but noted as actor in 'Hamlet' and other Shakespearean plays, and as theatrical manager.
- Kean, Edmund** (1787-1833), English Shakespearean tragedian, Coleridge said "Seeing him act was like reading Shakespeare by flashes of lightning" ('Shylock', 'Othello', 'Richard III').
- Keane, John Joseph** (1839-1918), American Roman Catholic archbishop and educator, born Ireland; founded churches and schools for Negroes in South; rector Catholic University of America 1886-97; established Confraternity of Holy Ghost; archbishop Dubuque, Iowa, 1900-11.
- Kearney** (*kúr'ní*), **Denis** (1847-1907), American labor organizer, born County Cork, Ireland; in 1868 emigrated to San Francisco; helped to organize the Workingmen's party of California in 1877.
- Kearney, Neb.**, town on Platte River, 125 mi. w. of Lincoln; pop. 9643; seat of Buffalo County; state hospital; state teachers college. Town named for Fort Kearney, built near by in 1848 to protect emigrants on Oregon Trail but abandoned in 1871: map N-57
- Kearny, Philip** (1815-62), American brigadier general and cavalry leader; captain in Mexican War; served twice in French cavalry to study methods; commanded brigade, then division, in Civil War; killed at Chancellery; nephew of Gen. S. W. Kearny.
- Kearny, Stephen Watts** (1794-1848), American major general; served in War of 1812; in war with Mexico occupied New Mexico; civil governor of California March-June 1847, of Vera Cruz and Mexico City for brief periods in 1848: F-16
- Kearny, N.J.**, suburb of Newark and New York City on Passaic River; pop. 89,487; linoleum, cotton and linen thread, celluloid, shipbuilding; named for Gen. Philip Kearny.
- 'Kearny'**, U. S. Navy destroyer, completed 1940; 1630 tons; damaged by German submarine on night of Oct. 16-17 when torpedoed while on convoy duty about 850 mi. s.w. of Iceland; 11 men killed; first engagement of 2d World War to result in death of U. S. Navy personnel.
- 'Kearsarge'**, U. S. cruiser A-99
- Keats** (*kéts*), **John** (1795-1821), English poet K-0
- quoted E-286, K-0, N-144
- Shelley's elegy, 'Adonais' S-110
- Keb**. See in *Index* Seb

Key—cápe, át, fár, fást, whát, fáll; mé, yét, fērn, thérre; íce, bít; rōw, wón, fōr, nót, dq; cáre, báit, ryde, full, bárn;

Kebic (*kə'bī*), John (1792-1866), English poet and clergyman; professor of poetry at Oxford for 10 years; Kebble College built as a memorial ('The Christian Year').

Kebble College, Oxford O-260

Kebnekaise (*kəb'nū-kī-sū*), highest peak in Sweden, in Kjölen Mts. (7005 ft.).

Keeskemét (*kəch'kēm-ēt*), Hungarian "farmer-town" on plains 50 mi. s.e. of Budapest; pop. 83,000; tanning, milling, preserving; center of fruit, cattle, rye area; map B-326d-e

Ke'dah, unfederated state of w. Malay Peninsula; 3660 sq. mi.; pop. 480,000; M-43

Keddah, corral for trapping elephants in s.e. Asia B-249, picture B-248

Kedron (*kə'drōn*), Valley of, also Cedron, or Kldron, deep depression e. of Jerusalem where brook flowed in ancient times; mentioned in Bible: J-211

Keel, the lengthwise timber or structure at the bottom of a ship S-126-7, picture S-121

Keol, false, an extra keel, often weighted, below the true keel of a ship, to help strengthen and stabilize the vessel.

Keeley, Leslie (1842?-1900), American physician, originator of cure for alcohol and drug addicts; graduated Rush Medical College, Chicago; entered Federal army as surgeon; practised in Dwight, Ill.; opened sanitarium there for his cure, later establishing branches in many cities.

Keel'ing Islands. See in Index Cocos Islands

Keel Mountains. See in Index Kjölen Mountains

Keelsen, a timber or beam bolted over a ship's keel to help stiffen the vessel.

Keelung (*kə'lūng'*), Formosa, seaport in n.; pop. 85,000; F-160, map F-186

Keen, William W. (1837-1932), American surgeon, born Philadelphia, Pa.; professor surgery Jefferson Medical College 1889-1907; pioneer work in delicate operations of brain and nervous system; wrote and edited many books on surgery and anatomy.

Keene, Charles Samuel (1823-91), English pen-and-ink artist, for 40 years a contributor to *Punch*; foremost among English craftsmen in black and white, but work has never been popular because of its unconventionality.

Keene, Laura (1820-73), Anglo-American actress and manager; her company was playing 'Our American Cousin' at Ford's Theater, Washington, D. C., when Lincoln was assassinated.

Keene, N.H., city on Ashuelot River, 43 mi. s.w. of Concord; pop. 13,832; woolen goods, chairs, shoes; state teachers college; summer and winter resort; map N-88

Keene's cement C-128

Keep, of castle, inmost and strongest part C-94, picture C-93

Keewatin (*kə-wū'tin*), District of, in e. Canada, part of Northwest Territories in Laurentian Plateau; about 228,160 sq. mi.; mostly desolate tundra region: N-170, map C-50b-c

Keewatin ice sheet I-2b, map I-3

Ke'l'r (*kə'l'ēr*), a drink made from milk M-173

Keighley (*kəth'li* or *kə'll*), town in Yorkshire, England, 55 mi. n.e. of Liverpool; Leeds-Liverpool Canal

connects it with Hull; manufactures worsted, tools, machines, paper; pop. 40,000.

Keljo, Korea. See in Index Seoul

Ketel (*kē'tēl*), Wilhelm (born 1882), German army officer, born Heimscherode, Germany; captain on war staff in 1st World War; made commander in chief (1938) of all the armed forces of Germany; credited with aviation strategy that defeated France in 1940: picture W-178i

Kelth, Sir Arthur (born 1866), British anatomist and anthropologist, born Aberdeen, Scotland; a leading authority in study of human race and its antiquity and expert on reconstruction of prehistoric man from fragments or fossil remains ('Ancient Types of Man', 'The Human Body', 'Nationality and Race').

Keith, Francis Edward James (1896-1758), Scottish soldier, Jacobite adherent, field marshal under Frederick the Great in Seven Years' War; resolute and prompt in action, skillful in tactics.

Kekulé (*kə'kq-lā*), or Kekulé von Stradonitz, Friedrich A. (1829-96), German chemist; devised "graphic formulae" for organic chemistry; chemistry of explosives, dyestuffs, and coal-tar products based largely upon his researches benzene B-97

Ke'lantan, unfederated state of Malay Peninsula; 5750 sq. mi.; pop. 890,000; M-43

Kel'm rug R-171, 172

Keller, Helen (born 1880), American blind and deaf woman of remarkable achievements K-10

Kellermann (*kə'l'ēr-mān*), Bernhard (born 1879), German novelist; early novels subjective ('The Fool'); later work treats social problems ('The Ninth November').

Kellermann, François Christophe de (1735-1820), French Revolutionary general, marshal of France, victor at Valmy (1792) over Prussians; father of François Etienne de Kellermann, one of Napoleon's ablest generals.

Kelley, Edgar Stillman (born 1857), American composer and conductor, born Sparta, Wis.; director Cincinnati Conservatory of Music ('New England Symphony'; 'Pilgrim's Progress', oratorio).

Kellgren, Johan Henrik (1751-96), Swedish poet, critic, and journalist; co-founder and editor *Stockholms-posten*; librarian and private secretary to Gustavus III; wrote excellent lyrics and dramatic poems.

Kellogg, Clara Louise (1842-1916), American operatic soprano, born Sumterville, S.C.; extensive repertoire; toured U.S. with her own company.

Kellogg, Elijah (1813-1901), American minister and writer for the young, born Portland, Me. 'Spartacus to the Gladiators at Capua' S-240

Kellogg, Frank B. (1856-1937), American lawyer and diplomat, born Potsdam, N.Y.; U.S. senator from Minnesota 1917-23; ambassador to Great Britain 1923-24; secretary of state 1925-29; co-author of Kellogg-Briand Pact to outlaw war; awarded Nobel peace prize for 1929; elected World Court judge 1930, resigned 1935.

Kellogg, Vernon Lyman (1867-1937), American zoologist, born Emporia, Kan.; professor entomology, Stan-

ford University 1894-1920; secretary National Research Council 1919-31, after 1931 secretary emeritus; wrote on zoology, entomology, heredity, and evolution.

Kellogg, Idaho, town 33 mi. s.e. of Coeur d'Alene; pop. 4235; one of largest lead mines in U. S. is here.

Kellogg-Briand Pact, or Pact of Paris (Treaty for the Renunciation of War, 1928) C-354, A-247

ineffectiveness of N-75b

signing of, picture P-91

Kells, market town of County Meath in e. Ireland; of ancient origin; pop. 2000; celebrated *Book of Kells*, beautifully illuminated copy of the Gospels in Latin, preserved in Trinity College Library, Dublin cross, picture I-126

Kells, Book of B-178

Kelly, Colin P., Jr. (1915-41), U.S. Army aviator, born Monticello, Fla.; in defense of Philippines, Dec. 10, 1941, bombed Japanese battleship *Haruna*; killed when his bomber crashed after he had ordered crew to parachute to safety.

Kelly, Eric Philbrook (born 1884), American writer and educator, born Amesbury, Mass.; began as newspaper reporter, later professor of journalism at Dartmouth; lectured at Crakow, Poland, as scholar of Kosciuszko Foundation; author of 'Trumpeter of Krakow', awarded Newbery medal (1929).

Kelly, George (born 1887), American playwright, born Philadelphia, Pa.; on vaudeville stage 5 years, writing own features; later wrote penetrating plays tinged with satire of middle-class society ('Craig's Wife', awarded Pulitzer prize 1925; 'The Showoff').

Kelly, John (1822-86), American politician, born New York City; joined Tammany organization 1858; U.S. congressman 1855-59; sheriff of New York County 1859-61 and 1865-67; opposed the "Tweed Ring" and controlled Tammany 1874-82.

Kelly, William (1811-88), American inventor, born Pittsburgh, Pa.; invented process for making steel Kelly process I-142

Kelly Field, Texas, 5 mi. s. of San Antonio; U. S. army air field established 1917, long used as a training center

Kelmscott Press M-281

folio Chaucer, picture B-180

Kelp, any large coarse seaweed S-72, 73

Kel'pies, water fairies F-3

Keltie, Sir John Scott (1840-1927), British geographer, born Dundee, Scotland; editor *Statesman's Year Book* for 43 years ('History of the Scottish Highlands and Clans'; 'The Partition of Africa').

Kelts. See in Index Celts

Kel'tin, William Thomson, first Baron (1824-1907), British physicist E-233, picture E-232

age of earth estimated by E-130

Atlantic cable C-5-6, 8-9

Kemal (*kə-māl'*) **Atatürk** (*ä'tä-tärk*) (1880-1938), president of Turkey; former name Mustapha Kemal; held high commands in World War 1914-18; organized and headed Nationalist government in Angora 1920 and swept Greek forces from Asia Minor 1922: T-181, 164, 166, pictures D-67d, T-163

Kemble, famous family of English actors; most celebrated members were Mrs. Siddons, her brothers

- John Philip and Charles, and her niece Fanny.
- Kemble, Fanny** (Frances Anne) (1809-93), English actress and author, daughter of Charles Kemble ('Journals', interesting picture of American life).
- Kemerovo**, industrial city in s. cent. Siberia; coal mining; iron, steel, and chemical manufactures; pop. 135,000; map A-332b
- Kemmel**, Mont, isolated rocky hill 6 mi. s.w. of Ypres; overlooks Flanders plain to n.e. and s.e.; taken by Germans April 28, 1918.
- Kemmerer**, Edwin Walter (born 1875), American economist, born Scranton, Pa.; professor economics and finance, Cornell University, 1909-12, Princeton University after 1912; financial adviser to U.S. Philippine Commission, to Mexico, Guatemala, Colombia, Union of South Africa, Chile, Poland, Ecuador, Bolivia, and China; author of numerous works on economics.
- Kempe**, William (flourished 1593-1602), English actor and dancer; acted in Elizabethan plays, especially those of Shakespeare; famous for his morris dancing.
- Kem'pis**, Thomas à (1380?-1471), German monk and mystic, remembered for one book, the 'Imitation of Christ', a classic of devotional literature.
- Kemp Land**, district in Antarctic, maps A-190, A-215
- Ken**, Thomas (1637-1711), English bishop, one of seven who were imprisoned for refusing to read the Declaration of Indulgences issued by James II, but who, following the revolution, lost his bishopric rather than transfer his loyalty from James II to William of Orange; remembered today for his hymns, notably 'Praise God from Whom All Blessings Flow' and 'Awake, My Soul, and with the Sun'.
- Kenai** (kē-ni') Peninsula, in s. Alaska bordering Cook Inlet; 150 mi. long; farm lands, coal deposits; best harbor, Seward; map A-105
- Kendall**, Amos (1789-1869), American statesman, born Dunstable, Mass.; in Treasury Dept. under Jackson; instituted money-order system while postmaster general; interested with Morse in development of telegraph; edited newspapers, founded Columbia Institute for Deaf and Dumb.
- Kendall**, Henry Clarence (1841-82), Australian poet, son of missionary; held government posts at Sydney; journalist at Melbourne 1869-73; wrote of Australian landscape with fine sensitiveness: A-376
- Kendrick**, John (1745?-1800), American navigator, born Boston; died Hawaii; commanded privateer during Revolutionary War and later explored n.w. coast of America and Pacific Islands.
- Kenilworth**, England, small town in Warwickshire; ruins of castle given by Queen Elizabeth to Earl of Leicester; scene of Scott's novel 'Kenilworth'.
- 'Kenilworth'**, novel by Scott S-51
- Kenilworth ivy**, a creeping perennial plant (*Cymbalaria muralis*) of the figwort family, native to Europe. Trailing stems root at nodes (joints); leaves lobed; flowers lilac with yellow throat, tiny; often found in greenhouses, rock gardens; also called mother-of-thousands.
- Kenmore**, N.Y., suburb of Buffalo 6 mi. n.; pop. 18,612.
- Kenna**, John Edward (1848-93), American statesman, born Valcoulan, W. Va. (then Virginia); entered Confederate army during Civil War when 16; after war worked as coal miner, then studied law; admitted to bar 1870; served 3 terms in House of Representatives and 2 in U.S. Senate, where he was prominent Democrat.
- Kennebec** (kēn'ē-bēk) River, 2d largest river of Maine; rises in Moosehead Lake, flows s. 190 mi. to Atlantic; map M-38
- Kennedy**, Charles Rann (born 1871), American actor and dramatist, born England; husband of Edith Wynne Mathison; plays are serious and religious in tone ('The Servant in the House').
- Kennedy**, Joseph Patrick (born 1888), banker, business executive, and statesman, born Boston, Mass.; chairman, Securities and Exchange Commission 1934-35; chairman U.S. Maritime Commission 1937; ambassador to England 1937-40.
- Kennedy**, Margaret (Mrs. David Davies) (born 1896), English novelist; absorbing narrator, skilled in depicting unconventional characters ('The Constant Nymph').
- Kennel Club**, American D-81
- Kennelly**, Arthur Edwin (1861-1989), American electrical engineer, born Bombay, East India; principal electrical assistant to Thomas Edison 1887-94; professor of electrical engineering Harvard after 1902.
- Kennelly-Heaviside layer**, hypothetical layer of ionized air above the earth, which reflects radio waves; suggested by Oliver Heaviside and A. E. Kennelly: R-24, B-22, chart A-63
- sunspots** affect S-329
- Ken'saw Mountain**, a height 25 mi. n.w. of Atlanta, Ga., where Confederates repulsed Sherman's army, inflicting heavy losses June 27, 1864; a national battlefield park.
- Kenneth I**, MacAlpine (died 860?), king of the Scots and conqueror of the Picts, often called first king of Scotland S-46
- Kenney**, George Churchill (born 1889), U.S. Army officer, born Yarmouth, Nova Scotia; with air service after 1917; made commander of Air Forces of United Nations, in s.w. Pacific Aug. 1942.
- Kenny**, Elizabeth (born 1886), Australian nurse (addressed as "Sister"), famous for method of treating infantile paralysis; affected musclics exercised, massaged, and treated with heat and moisture; came to U.S. 1940.
- Kenora**, Ontario, manufacturing center and summer resort on Lake of the Woods, 130 mi. e. of Winnipeg, Manitoba; pop. 6786; flour, lumber, pulp and paper mills, boat factories, fisheries; gold, silver, copper, mica in vicinity; map C-56b
- Keno'sha**, Wis., manufacturing city and port on s.w. shore of Lake Michigan, 33 mi. e. of Milwaukee; pop. 48,766; map W-124
- manufactures** W-125-8
- Ken'sington**, borough of w. London, England; pop. 181,000; Kensington Palace (birthplace of Victoria) and Gardens; residence of Thackeray Albert Memorial, picture L-184
- Peter Pan statue**, picture B-51
- Kensington Stone**, a stone dug up in 1895 near Kensington, Minn., bearing an inscription in runic char-
- acters indicating that a party of Norse explorers camped there in 1862. Believed by some scholars to be authentic, by others to be a hoax. Now on display in Chamber of Commerce at Alexandria, Minn.
- Kent**, Edward Augustus, Duke of (1767-1820), English prince, 4th son of George III; father of Queen Victoria.
- Kent**, James (1763-1847), American jurist and author; his 'Commentaries upon American Law' is a legal classic which has exerted an influence comparable to that of Blackstone's 'Commentaries'.
- Kent**, Rockwell (born 1882), American artist and author, born Tarrytown Heights, N.Y.; paintings, drawings, and woodcuts are strongly and simply executed and show imaginative force and individuality; author and illustrator of 'Wilderness'; 'Voyaging'; 'N by E' 'Moby Dick', pictures W-77, H-313
- painting** P-29
- wood engraving** E-294
- Kent**, s.e. county of England; 1519 sq. mi.; pop. 1,194,000; called "garden of England" from its rich soil and picturesque scenery; first landing place of Anglo-Saxon invaders
- Canterbury and early kingdom** C-76
- Joseph Conrad** in C-341
- Kent Island**, largest island in Chesapeake Bay, Md., 7 mi. e. of Annapolis; oyster fisheries
- first settlement** in Maryland M-77
- Kenton**, Simon (1755-1836), American pioneer, born Fauquier County, Va.; in 1775 went to Kentucky with Boone; captured by Indians while stealing horses, 1777, was tied naked to back of a horse which was turned loose; later released to British troops, and escaped back to Kentucky.
- Kent State University**, at Kent, Ohio; founded 1910; arts and sciences, education, business administration, graduate school.
- Kentucky**, an e. cent. state of U.S.; 40,395 sq. mi.; pop. 2,845,627; cap. Frankfort: K-10-14, maps K-11, U-188c
- agriculture** K-10-12; tobacco T-102, 103, 104
- bird**, state B-122
- cities** K-12, list K-10. See also in Index names of cities
- education** K-14, 13
- flag** F-81, color plate F-87
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- forests**, national and state, table F-250
- history** K-13-14: Daniel Boone B-192; George Rogers Clark C-259; nullification resolutions S-279, A-14, A-127; Civil War K-14, C-253, 255
- horses** K-11, 12, H-344, picture K-10: Kentucky Derby L-209
- manufactures** K-12, L-209
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- name**, origin of, and nickname S-279
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- pioneer life** P-221a-c
- products**, chart K-11, list K-10
- song**, state F-164
- Kentucky**, University of, at Lexington, Ky.; founded 1865; agriculture, engineering, law, arts and sciences, education, commerce; graduate and extension work.
- Kentucky Dam**, in Kentucky, table D-357

Key—cāpe, āt, tar, fāst, whāt, fūll, mē, yēt, fērn, thēre; ice, bīt; rōw, wōn, fōr, nōt, dē; cāro, bāt, ryde, fūll, bārn:

Kentucky Derby, the foremost race in the United States for running horses, held every May since 1875 at Churchill Downs, Louisville, Ky. *Kentucky Resolutions* A-127, S-279, A-14

Kentucky River, in Kentucky, formed by several forks, rising in Cumberland Mts. of s.e.; flows 250 mi. n.w. to Ohio River; navigable to Frankfort: *map* K-11

Kentucky warbler, *picture* W-7

Ken'ya, Mount, volcanic peak in British East Africa (17,140 ft.); discovered 1849; first ascended 1899.

Kenya and Uganda Railways. *See in Index* Uganda Railway

Kenya Colony and Protectorate, part of British East Africa on Indian Ocean s. of Ethiopia; 224,960 sq. mi.; pop. about 3,000,000; cap. Nairobi: E-138, *maps* E-139, A-42a Victoria Nyanza borders V-297

Ken'yahs, a tribe of natives in Borneo, of good physique and intelligence, skilled in metal work and carving.

Ken'yon College, at Gambier, Ohio; for men; founded 1824 (at Worthington, moved 1827 to Gambier); Protestant Episcopal; arts and sciences, theology.

Ke'okuk ("one who moves alertly") (1780?-1848), American Indian of the Fox clan; became leader of Sauks and Foxes and secured for them the territory of Iowa from the government; buried in Keokuk, Iowa, which was named for him. His son, Moses Keokuk (1813?-1903) was a famous Indian orator.

Keokuk, Iowa, jobbing and manufacturing city on Mississippi and Des Moines rivers in s.e. corner; pop. 15,076; cereals, steel and rubber products, carbide, shoes: *map* I-120, *map* I-120, 122, T-156

Kephallenia (*kēf-ā-lē'n-ā*), or Cephallonia, mountainous Greek island w. of mainland; largest of Ionian group; about 260 sq. mi.; pop. 71,000; currants and other fruit, olives, olive oil: *map* B-18

Kephart, Horace (1862-1931), American author, born East Salem, Pa. ('Camping and Woodcraft'; 'The Camper's Manual') camp clothing and equipment C-43

Kep'ler, Johann (1571-1630), German astronomer who formulated laws of planetary motion K-14-15 theory of moon's craters M-253

Kepler's laws of planetary motion K-15

Keppel, Frederlek Paul (1875-1943), educator, born Staten Island, N. Y.; dean of college, Columbia University 1910-18; assistant secretary of war 1918-19; president Carnegie Corporation 1923-41.

Ke'rak, Asia Minor. *See in Index* Trans-Jordan

Kerak'to, also karatto, name of several West Indian agaves and their fibers.

Kerazeh, Palestine. *See in Index* Chozazin

Karbala, Iraq. *See in Index* Karbala

Kerch (*kērch*), or Kertch, Russia, Crimean port between Black and Azov seas, on Kerch peninsula; pop. 105,000; iron mining; suffered in Crimean War: *map* E-326e

Keren'sky, Alexander Fedorovich (born 1881), Russian revolutionary statesman, head of the provisional government of 1917: R-189

Keres, or Queres (*kā'rds*), a linguistic stock of North American Indians

living in pueblos on the Rio Grande and Rio Jemez and westward in New Mexico.

Kerguelen (*kē'gē-lēn*) Land, a desolate uninhabited volcanic island 85 mi. long on s. border of Indian Ocean midway between Cape of Good Hope and Australia; French possession; discovered 1772 by Yves Joseph de Kerguelen-Trémarec: *map* A-214

Kerguelen-Trémarec (*kē'gē-lēn trā-mā-rēk'*), Yves Joseph de (1745-97), French explorer; discovered (1772) what he thought was rich new southern continent and named it South France; realizing it was only a barren island, renamed it Desolation Island; later called Kerguelen Land.

Kerkyra. *See in Index* Corfu

Kermadec Islands, group in Pacific about 600 mi. n.e. of New Zealand, to which it was annexed in 1887; total area, 19 sq. mi.; Raoul or Sunday Island, largest of group, 20 mi. in circumference: *map* P-10b-e

Kerman (*kēr-mān'*), or Kirman, Persia, in s.e.; cap. of province of same name; pop. 60,000: P-130, *map* A-332b

Kermanshah (*kēr-mān'shā*), city in w. Persia; pop. 70,000; on high road between Baghdad and Teheran; trade in grain, fruit, rugs; notable also for ruined walls: *map* A-332b

Ker'mess, bazaar F-5

Kernite, or rasorite, mineral yielding borax B-192, M-183

Kern River, stream rising in mountains of s.e. California; flows s.w. and n. to Lake Tulare: *map* C-28

Ker'osene, or coal oil, a mineral oil distilled from petroleum P-149

first used P-145
gas engine fuel G-19
lamps and lighting L-57
rust removed by R-199
soaps contain S-177

Keresene emulsion S-263

Kerr, Hugh Thompson (born 1872), American clergyman, born Elora, Ontario, Canada; pastor Shadyside Presbyterian Church, Pittsburgh, Pa.; elected Moderator of Presbyterian Church in America 1930.

Kerr, Sophie (Mrs. Underwood) (born 1880), writer, born Denton, Md.; author of short stories and magazine editor ('Love at Large'; 'Confetti'; 'Curtain Going Up').

Ker'ry, county of s.w. Ireland in province of Munster; 1815 sq. mi.; pop. 140,000; beautiful mountain scenery; lakes of Killarney.

Kerry blue terrier D-82

Kerry cattle C-104

Kersey, thick woolen cloth similar to melton.

Kerst, Donald W. (born 1911), physicist, born Galena, Ill.; at University of Illinois, invented betatron X-ray production X-202

Kertch, Russia. *See in Index* Kerch

Kes'trel, or windhever, a bird of prey, one of the smallest of the true falcons (*Falco tinnunculus*) found throughout the Old World; it resembles the common sparrow hawk of America to which it is closely related; a strong flier, hovers for a minute or two in one spot.

Ketch, a sailboat, *picture* B-164

Ketchikan, Alaska, town and port of entry in s.e. Alaska 235 mi. s.e. of Juneau; pop. 4695; served by steamships from Seattle and Van-

couver; center for fishing, salmon canning, lumbering, mining, fox farming: *map* A-105

Ket's Rebellion. *See in Index* Kett's Rebellion

Kettering, Charles F. (born 1876), American engineer and inventor, born near Loudonville, Ohio; originated Delco electric power and light generating unit for farmhouses; president and general manager General Motors Research Corporation

electric automobile starter A-406

Kettledrums, or tympani D-114, *picture* M-322

Kettle Hill, Cuba. *See in Index* San Juan Hill

Kett's (or Ket's) Rebellion, a revolt in Norfolk, England (1549), led by William and Robert Kett against the unlawful closing off from the people of common land; suppressed, at great loss to rebels, by forces under leadership of Earl of Warwick; Kett brothers executed.

Keuka College, at Keuka Park, N.Y.; Baptist institution for women, founded 1921; arts and sciences.

Kew (*kū*), suburb of London, England; famous for its botanical gardens presented to public by Queen Victoria in 1840; pop. 4500.

Kewanee (*kē-wā-nē*), Ill., manufacturing city 41 mi. n.w. of Peoria, with coal-mining interests; pop. 16,901; boilers, gloves, fitting and monkey wrenches.

Kewau'nee, Wis., port on Lake Michigan 25 mi. e. of Green Bay; pop. 2533; important shipping point car ferry terminal M-155, R-41

Kew barometer, or marine barometer B-50

Keweenaw (*kē-wē-nū*) Bay, inlet of Lake Superior in n. peninsula of Michigan, *map* M-153
copper shipping S-331

Keweenaw Peninsula, in Lake Superior, northernmost projection of Michigan where most of state's copper is mined C-358

Key (*kē*), Ellen (1849-1926), Swedish social writer and feminist ('The Century of the Child'; 'The Woman Movement').

Key (*kē*), Francis Scott (1780-1843), American lawyer, born Fredericks County, Md.; educated St. John's College, Annapolis, Md.; practiced law, Frederick, Md.; district attorney, District of Columbia

writes 'Star-Spangled Banner' N-24; inspired by Fort McHenry flag F-98, *picture* F-90; words N-25

Key, in music, the group of tones in a scale, the key note of which gives the key its name, as major C is the key note or first in the scale of the key of C major.

Key, sending instrument in telegraphy T-32, *picture* T-33

Keyboard, piano, variations of P-212

Keyhole limpet, limpet with hole at tip of shell.

Keynes (*kānz*), John Maynard (born 1883), first Baron, English economist; strongly influenced economic policies of "New Deal" in United States; became member of board of directors of Bank of England 1941; originator of a compulsory savings plan ('The Economic Consequences of Peace'; 'How to Pay for the War').

plan for postwar currency stabilization W-1794

Keys, Florida K-15
coral formation C-362

Keys, House of, Isle of Man M-49

Keys and locks L-176-7
time locks, in banks, *picture B-41*

Key-sorting (*kē'ser-līng*), Hermann, Count (born 1880), German philosopher, born Könno, near Reval, Livonia (now Estonia) of wealthy German-speaking nobility; studied at Geneva, Dorpat, Heidelberg, Vienna; traveled extensively; inspired by Eastern thought; founded School of Wisdom at Darmstadt ('The Travel Diary of a Philosopher'; 'Europe'; 'The Recovery of Truth'; 'America Set Free').

Key-signature, in music. See in Index
Signatures, in music

Keystone, in arch A-249

Keystone State, popular name for
Pennsylvania P-111

Key West, Fla., winter and health
resort on island about 100 mi. n. by e. of Havana, Cuba; pop. 12,927; K-15, F-116, *maps F-111, 112*

Khabarovsk (*kā-bā'rōfsk*), U.S.S.R., city in e. Siberia, about 400 mi. n.e. of Vladivostok, near junction of Amur and Ussuri rivers; terminal of branch of Trans-Siberian R.R.; pop. 200,000; trade, industrial, and educational center; active fur trade; *map A-332b*

Khadija (*kā-dē'jā*), wife of Mohammed M-213

Khafo (*kā'frā*), also Khafra, Khefren, or Chephren, Egyptian king of 4th dynasty (2800-2700 B.C.); pyramid P-371, *pictures P-372, C-18*
Sphinx, a portrait of S-248-9, picture S-248

Khaki (*kā'kē*) (Indian word meaning "earth color"), a drab cotton material used for army uniforms U-177, L80

Khalidike (*kāl-kyī-thī-kyī'*), or Chalcidice, ancient name of peninsula in n.e. Greece with three smaller peninsulas projecting into Aegean Sea.

Khaliks (*kāl'kīs*), or Chalcis, Greece, chief town of island of Euboea; pop. 17,000

Aristotle flees to A-284

Khamzin (*kām'shīn* or *kām-sōn'*), hot, dust-laden wind blowing in Egypt in late spring. It is supposed to continue about 50 days, *Khamzin* being the Arabic word for "fifty."

Khan (*kān*), in Orient, large unfurnished inn, generally surrounding a court, for traders and their caravans
Damascus D-9
Greece G-163

Khanla, Crete. See in Index Canea

Khar'blo, or Harbin, railroad center
on Sungari River in e. cent. Manchukuo; pop. 470,000; M-52, 51, *maps M-49a, A-332b*

Kharga (*kār'gā*), oasis in Libyan Desert E-195, *map E-197*

Kharkov (*kār'kōf*), or Kharkof, Russia, important manufacturing city and one of largest cities of Ukraine; railway and aviation center; pop. 835,000; K-15, *map E-326e*
2d World War K-15, W-179a

Khartoum (*kār-tōm'*), also Khartoum, cap. of Anglo-Egyptian Sudan at union of Blue and White Niles; pop. 45,000; trade center on Cape-to-Cairo Railroad; Gordon College: E-195, *maps A-42a, b, E-197*
Kitchener captures K-26
siege of G-121

Khatmandu. See in Index Katmandu

Khattushash, ancient Hittite capital
H-312

Khaya (*kā'yā*), a genus of tropical trees of the mahogany family native to Africa from Gambia to

Madagascar. Grows to 150 ft. with a trunk 60 ft. to 100 ft. high; trees reach maturity at 100 yrs. Wood, often called African mahogany, has pale rose to dark red brown heartwood, gray white to red brown sapwood; 4 species, dry-zone, red, white, and bigleaf khaya make up bulk of this wood and they often appear in trade under name of port from which shipped, as "Benin mahogany," "Lagos mahogany." Used as veneer for furniture, store fixtures, plywood; lumber used for ships, boats, and caskets.

Khayyam (*kī-yām*), Omar (died 1123?), Persian mathematician, astronomer, and poet P-134

Khedive (*kē-dēv'*), Turkish viceroy in Egypt E-200

Khefren, Egyptian king. See Khafre
Khelat, Baluchistan. See Kalat

Kherson (*kēr-sōn'*), port on Dnieper River in s. Russia, 100 mi. e. of Odessa; pop. 97,000; grain and woollen mills, tobacco manufactures: *map B-154*

Khingán (*kīn-gān'*), mountain range in China; Great Khingán in e. Mongolia and n.w. Manchuria; continuation in n.e. Manchuria s. of the Amur known as Little Khingán: *maps C-211, A-332b*

Khios. See in Index Chios

Khiva (*kē'vā*), former khanate and its capital in Russian Turkestan; in ancient times a great kingdom; following Russian Revolution became a soviet republic, later divided between republics of Turkmenistan and Uzbekistan; city of Khiva (pop. 25,000), 180 mi. s. of Lake Aral, now included in Uzbekistan; *map A-332b*

Khmers (*kēmēz*), people inhabiting Cambodia, parts of Siam, and s. Cochín-China; tall and muscular with large, dark eyes; remnants of cultured ancient race; according to tradition came from India: I-73b, A-332, *picture I-73*

Khorasan (*kō-rā-sān'*), also Khorasan, or Khurasan, mountainous province of n.e. Persia (Iran) nomads prey on farmers P-131
rainfall R-47

Khorsabad (*kōr-sā-bād'*). *See in Index* Dur-Sargon

Khotan (*kō'tān'*), also Hotien, Chinese Turkestan, trade city in s.w.; pop. 30,000; *map A-332b*
bazaars A-328

Khufu (*kō'fō*), or Cheops (about 2800 B.C.), Egyptian king of 4th dynasty Great Pyramid P-371-2, E-204, *pictures E-196, C-18*

Khus-ikhus. See Veviter

**Khyber (*kē'bēr*) Pass, narrow mountain pass between India and Afghanistan; length 33 mi.; great strategic importance for 2000 years; now under British control: A-29, 30, *map I-30*
British forts, *pictures A-29, 31***

Kiang (*kī-āng'*), wild animal of Asia, resembling both ass and horse.

Kiangsi (*kī-āng-sē'*), an inland province of China; 77,301 sq. mi.; pop. 15,820,000; cap. Nanchang; coal, iron, copper, tea, silk: *map C-212*

Kiangsu, a maritime province of cent. China; 41,880 sq. mi.; pop. 36,470,000; cap. Nanking; chief city Shanghai; one of China's richest, most fertile regions: *map C-212*

Kiaoehow (*kē-ou-ohou'*), town, bay, and district on e. coast of Chinese province of Shantung, *map C-212*
Japan's interests: J-192

Kickapoo Indians, tribe of Algonquian

stock; closely related to Sank and Fox; first known in cent. Wisconsin; moved s. into Wabash River region of Indiana and Illinois, some as far s. as Mexico; later parts of tribe removed to Indian Territory.

Kicking Horse Pass, in Rocky Mts. of e. British Columbia; 5206 ft. high; traversed by Kicking Horse River; magnificent scenery: *picture B-245*

Kid, goatskin leather
glove manufacture G-107
imitation G-109
kinds L-85

Kidd, Benjamin (1658-1916), English sociologist; his 'Social Evolution' (1894) is one of the most widely read books in its field, having been translated into many languages.

Kidd, William, Captain (1650?-1701), British pirate K-15-16

Kidderminster, England, town in
Worcestershire on Stour River; pop. 27,000; noted for manufacture of carpets; *map E-270a*

Kidderminster carpet R-173

'Kidnapped', a tale of adventure by
Stevenson (1886) in which the hero, David Balfour after being kidnapped and cast away on a desert island meets the Jacobite, Alan Breck Stewart. 'David Balfour', a sequel, completes their adventures.

Kidney bean (French name haricot), kidney-shaped seed of the common bean type B-65

Kidney cotton, or Brazilian cotton, a
type whose seeds grow in a kidney-shaped mass C-382

Kidneys, in human body K-18

function as organ of nutrition P-202

Kido (*kē'dō*), Takayoshi (1832-77), Japanese statesman, plotted and carried through the coup d'état of 1868; advocate of Western civilization and constitutional government; founder of first real Japanese newspaper.

Kid'ron, Valley of. See Kedron

Kiev (*kē'yēf*), or Klev, capital of the Ukrainian Soviet Socialist Republic; pop. 845,000; K-18, *map E-326e*
Middle Ages R-183, R-195
2d World War K-16, W-179a

Kieffer pear P-95

Kieft (*kēft*), William (Wilhelmus) (died 1647), director general of Dutch colony of New Netherland 1638-47; became unpopular for his tyrannical methods; held responsible for massacre of the River Indians 1643 and beginning of disastrous wars between colonists and Indians

prohibits smoking, *picture I-151*

Kiel (*kēl*), Germany, chief naval port of Germany on Baltic; pop. 250,000; shipyards, iron manufactures; university; terminus of Kiel Canal; scene of German naval mutiny in 1918: *maps G-66, E-326d*

Kiel, Peace of, treaty by which Denmark ceded Norway to Sweden in 1614, as compensation for Sweden's having lost Finland to Russia. By an Act of Union (1815) Norway was to be independent of Sweden, but with the same king.

Kiel Canal, strategic and commercial
German canal across base of Danish peninsula, connecting the Baltic and the North seas; runs 60 miles from Holtenau on the Baltic to Brunsbüttel near the mouth of the Elbe; completed 1895: C-68, *map G-66*
Helgoland protects H-271
in 1st World War B-32

Kielce (*kē-yēll'sū*), Poland, city in mountains 95 mi. s. of Warsaw;

Key—cápe, át, fār, fást, wáht, fáll; mē, yát, fērn, thérre; íce, bít; rōw, wón, fōr, nót, dq; cūre, bāt, ryde, fyll, bárn;

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- King bird of paradise**, color plate P-84-5
- King cobra**, or hamadryad, a large cobra-like snake C-291
- King crab**. See in Index Horseshoe crab
- Kingcup**, name given to marsh marigold in England M-71
- Kingdom**, in plant and animal classification B-116
- King Edward VII Land**, an Antarctic region discovered by Scott expedition in 1901, map A-215
- Kingfish**, family group of excellent food fish (*Menticirrhus*); dull in color; abundant in shallow water from Cape Ann southward; bottom-fish without air bladder and with lower fins much enlarged. Name also applied to a large Spanish mackerel (*Scomberomorus*) of the West Indies.
- Kingfisher** (ancient name halcyon), a fish-eating bird K-21, color plate B-137
- female brightly colored B-131
- King George Sound**, at s.w. tip of Australia; British naval base.
- King George's War**, name given by English colonists to conflict in America between French and English 1744-48 (in Europe called the War of the Austrian Succession) K-22
- Aoaiians banished A-4
- King George V Land**, district in Antarctic, n. of Adèle Land; named by Sir Douglas Mawson who discovered it; map A-215
- King grasshopper**, picture G-137
- 'King Henry IV'**, one of best of Shakespeare's historical plays, written about 1598, in two parts; although it concerns life of Henry IV, interest centers about Prince Hal, Henry's frolicsome son, and Falstaff, great comic character quoted H-276
- 'King Henry V'**, historical drama by Shakespeare written about 1599; concerns gay Prince Hal, now wise King Henry V, up to time of his marriage with Katherine of France.
- 'King Henry VI'**, historical drama in three divisions, most of which Shakespeare wrote or revised; relates events in life of Henry VI of England ending in Henry's assassination by Gloster; written about 1591-94.
- 'King Henry VIII'**, historical drama written by Shakespeare in collaboration with another dramatist, about 1611; concerns life of Henry with Queen Katherine and with Anne Boleyn, ending with christening of the noted Elizabeth.
- King Island**, an island 40 mi. long n.w. of Tasmania; map A-372a, b
- King James Version of Bible** B-103
- literary value W-187
- 'King John'**, Shakespeare's earliest historical play, dramatizing life of John, infamous usurper of English throne, and his struggle to keep power from his nephew Arthur, rightful heir chronology and rank S-100e
- "King King Kloria,"** game P-253, picture P-253
- 'King Lear'**, tragedy by Shakespeare K-22
- chronology and rank S-100e
- Kinglets**, various tiny insect-eating birds K-22, color plate B-140
- 'King Log and King Stork'** A-28
- 'King-Maker, The.'** See in Index Warwick, Richard Neville, Earl of
- Kingman Reef**, U. S. naval base in Pacific, 1100 mi. s. of Honolulu; 1 sq. mi.; radio station.
- 'King of the Golden River'**, story by Ruskin R-177
- King penguin** P-109, 110, pictures P-109, Z-221
- King Philip's War** (1675-76), led by King Philip, chief of Wampanoag Indians, against New England colonists K-22-3
- Springfield burned S-264
- King rail** R-35, picture R-35
- 'King Richard II'**, historical drama by Shakespeare, written about 1595, in which Richard's insincerity and partiality lead to Bolingbroke's ascension to throne (as Henry IV) and to Richard's murder.
- 'King Richard III'**, historical tragedy by Shakespeare written about 1595; plot woven about cynical, ruthless Richard, who perpetrates many deaths to gain desires; slain in battle: R-104
- Kings**, eleventh and twelfth books of the Old Testament, usually written I Kings and II Kings, dealing with the period that embraces the reigns of all the kings of Israel except Saul and David.
- King salmon** S-13
- King's Bench** (or Queen's Bench), Court of, in England, deals chiefly with criminal cases C-385
- Kings Canyon National Park**, in California N-22b, map C-28
- King's Chapel**, Boston B-202
- King's College**, N.Y., now Columbia University N-130
- King's College**, Toronto, now University of Toronto T-113
- Kings College**, University of, at Halifax, Nova Scotia, Canada; Anglican; founded 1789 at Windsor; royal charter 1802; moved to Halifax 1923; arts, science, theology.
- King's evil**. See in Index Scrofula
- Kingsford**, William (1819-98), Canadian engineer and historian, born England; surveyed Lachine Canal; helped build Hudson River Railroad and Panama Railroad, was Dominion engineer in charge of St. Lawrence River and the Great Lakes ('History of Canada' in 10 vols.).
- Kingsford-Smith**, Sir Charles E. (1897-1935), Australian aviator; completed in 1930, at Oakland, Calif., world flight begun 1928; lost 1935 on England to Australia flight; picture A-73, table A-74
- King's Highway**, from New York City to Philadelphia R-116
- Kingsley, Charles** (1819-75), English clergyman and author K-23, N-182
- quoted on Shakespeare S-100c
- sweatshop named by S-334
- Kingsley, Henry** (1830-76), English novelist, brother of Charles Kingsley ('Ravenshoe').
- Kingsley, Mary H.** (1862-1900), English author, ethnologist, niece of Charles Kingsley; wrote books on travels and studies in w. Africa.
- Kingsley, Sidney** (born 1906), American playwright; 'Men in White', Pulitzer prize play (1934), about a city hospital; 'Dead End', pungent drama of a tough gang of New York City boys.
- Kingsley Dam**, in Nebraska, table D-357
- Kings Mountain**, ridge between North Carolina and South Carolina, 30 mi. s.w. of Charlotte, N.C.; victory of Americans over British October 1780; made national military park in 1931: S-85, S-216, T-48
- King snake** S-173, picture S-189
- Kingsport**, Tenn., city on Holston River 88 mi. n.o. of Knoxville; pop. 14,404; leather, cement, books, lumber, brick, tile, paper, silk.
- King's Road**, or El Camino Real, in California R-116, S-223
- King'ston**, Charles Camcron (1850-1908), Australian statesman; premier of South Australia 1893-99; instrumental in passage of radical laws on woman suffrage, land, and labor questions.
- Kingston**, Jamaica, on s. coast; capital, chief port, and railroad center; pop. 80,000; British naval base; seaplane harbor: map W-72b
- U. S. base near by J-181
- Kingston, N.Y.**, city on Hudson River, 55 mi. s. of Albany; pop. 28,589; trade in coal, stone, brick, lime, cement, lumber, and farm products; railroad shops, lace curtain mills; founded by Dutch 1652; first state constitutional convention and temporary cap. 1777; burned by British same year: map N-114
- Kingston**, Ontario, Canada, at n.e. end of Lake Ontario, historic city commanding entrance to St. Lawrence River; pop. 28,439; K-23, map C-500
- Kingston, Pa.**, borough on Susquehanna River 2 mi. n. of Wilkes-Barre; pop. 20,679; coal, cigars, silk; railroad shops; site of stockade Fort Fort built in 1772.
- Kingston-upon-Hull**, also Hull, seaport in n.e. England on Humber River; pop. 315,000; naval arsenal; fisheries: maps E-279, 270a
- Kingstown**, Ireland. See in Index Dun Laoghaire
- Kingsville**, Tex., town 35 mi. s.w. of Corpus Christi; pop. 7782; dairying center; headquarters of famous King Ranch (about 1,000,000 acres acquired by Richard King, a Rio Grande steamboat captain), first unit of which was established in 1854; Texas College of Arts and Industries.
- Kingtchen** (*king-tā-chén*), large mart of s.e. China, in province of Kiangsi on river Chang; pop. more than 100,000; great porcelain center: map C-212
- King vulture**, color plate B-130
- King William Land**, in n.e. Greenland, map G-176
- Amundsen at A-190
- King William's War** (1689-97), colonial war in North America; part of great struggle against Louis XIV: K-23, W-103
- Captain Kidd**, privateer K-15
- Frontenac** F-209
- Schenectady massacre** S-38
- Kinkajou** (*Cercopithecus caudivolvulus*), small mammal of the raccoon family; common in tropical regions of the Americas; feeds on honey, eggs, and small mammals; locally sometimes called a "honey bear"; often made a pet.
- Kinley, David** (born 1861), American educator and economist, born Scotland; taught at Goucher College, Baltimore, and University of Wisconsin; at University of Illinois after 1893, president 1920-80.
- Kinnereit** (*kin-ér-ét*), or Chinnereth, Lake. See in Index Galilee, Sea of
- Kino** (*ké'nō*), Eusebio, Jesuit missionary of 17th century, founder of missions in American Southwest A-287, S-222
- first to see Casa Grande ruins N-21
- route through Arizona, map A-289
- Tumacacori Monument** N-22d
- Kinston**, N.C., city on Neuse River 70 mi. s.e. of Raleigh; pop. 15,888;

Key—cápe, át, fär, fást, whát, fall; mé, yát, färrn, thäre; íce, bítt; rów, wón, fôr, nót, dq; cüre, bútt, ryde, füll, hárn;

- tobacco market; cotton, fertilizer, lumber, brick; Kinston College (colored); state school for feeble-minded: map N-158
- Kin'zie, John** (1763-1828), American pioneer, born Quebec, Canada; first white settler of Chicago: C-192
- Klaga, Lake**, in East Africa in Uganda Protectorate, map C-331
- Klilen** (*khä'lén*) Mountains. See in Index Kjölen Mountains
- Kloto, Japan**. See in Index Kyoto
- Kl'owa**, Indian tribe, formerly ranging in Oklahoma, Colorado, and Texas; now chiefly on reservation in Oklahoma: I-54
- love songs F-135
- Klpehaks** (*kíp-chüks'*), branch of the Mongols known as the "golden horde" M-223
- Kip'ling, John Lockwood** (1837-1911), British artist and educator; father of Rudyard Kipling K-24, 24a, 24b
- Kipling, Rudyard** (1865-1936), English writer, famous for stories of India K-24-5, E-287
- books by and about K-25
- dedication to history of Irish Guards, quoted K-24b
- elegy for Balesier quoted K-24a
- epitaph for Balesier, quoted K-25
- journalist K-24, 24a
- 'Just So' story of elephant, picture E-249
- limerick quoted L-138
- 'Namgya Doola', quoted W-186
- Nobel prize winner (1907) K-24b
- St. Nicholas contributor L-163, K-24a-b
- Kippered herring**, a herring which has been split, salted, dried, and smoked.
- Kip skins** L-83
- Kirby, Rollin** (born 1874), American cartoonist, born Galva, Ill.; became magazine illustrator; cartoonist on *New York Mail*, *New York Sun*; political cartoonist, *New York World* 1914-31, on *New York World Telegram* 1931-39; won Pulitzer prize three times.
- Kirby, William** (1817-1908), Canadian novelist, born in England; edited *Niagara* (Ont.) *Mail* for 20 years; collector of customs, *Niagara*, 1871-95 ('The Golden Dog'; 'U. E.', an epic poem; 'Canadian Idylls'): C-68
- Kirehloff** (*kirk-höf*), Gustav Robert (1824-87), German physicist; developed spectrum analysis and discovered cesium and rubidium (with Bunsen); explained the Fraunhofer lines
- spectroscopic discoveries S-241
- Kirghiz** (*kirk-gēz'*), nomadic people of central Asia, of Turko-Tataric (Mongolian) race, ranging from borders of European Russia to w. China: A-330
- in Afghanistan A-29
- Kirghiz Soviet Socialist Republic**, in cent. Asia; largely mountainous; area 78,062 sq. mi.; pop. about 1,460,000; stock raising, coal mining; cap. Frunze: T-158
- Kirin** (*kē-rin'*), Manchukuo, capital of Kirin province, s. e. Manchukuo; on Sungari River; trade center of large tobacco and timber areas; pop. about 130,000; ancient Manchu capital: map M-49a
- Kirklairell** (*kirk-lā-rā-lē'*), also Kirk-Killesa, vilayet and town in Turkey in Europe; pop., vilayet, 175,000, scene of first important Bulgarian victory over Turks in Balkan War of 1912.
- Kirk'stall Abbey**, at Leeds, England L-93
- Kirksville, Mo.**, city 170 mi. n.w. of St. Louis; pop. 10,080; seat of Adair County; shoes, printing and publishing; state teachers college College of Osteopathy O-253
- Kirkuk** (*kirk-kuk'*), Iraq, town about 150 mi. n. of Baghdad and connected to it by railroad; oil center; pop. about 20,000. Also, name of district, pop. about 92,000.
- Kirk'wall**, cap. of Orkney Islands, important British base during 1st World War; pop. 4000; fine Norman-Gothic cathedral begun in 1188: O-251, map E-270a
- Kirkwood, Samuel Jordan** (1813-94), American political leader, born Harford County, Md.; Civil War governor of Iowa; U.S. senator, and secretary of the interior under Garfield.
- Kirkwood, Mo.**, suburb of St. Louis; pop. 12,132; chiefly residential and trade city.
- Kirman, Persia**. See in Index Ker-man
- Kiruna, Sweden**, mining town n. of Arctic Circle S-337
- Kirunavara**, mountain in Sweden S-337
- Kirung'a**, or Mtumbiro, chain of volcanic mountains in Africa A-38
- Kish**, ancient city in lower Mesopotamia (Iraq), near the Euphrates, 8 mi. e. of Babylon K-25
- excavations K-25, pictures A-258, T-121
- Kishinev** (*kē-shē-nyōf'*), Rumanian Chisinau (*kē-shē-nū'v*), city in Bessarabia, 85 mi. n.w. of Odessa; pop. 115,000; agricultural center; ceded by Russia to Rumania after 1st World War; returned to Russia 1940; terrible pogroms (1903, 1905): map E-326e
- Kiskadden, Maude**. See Adams, Maude
- Kleka Island**, largest of Rat Islands, in Aleutians, map A-105
- 2d World War W-178y, 179
- Klamayu** (*kis-mā-yō'*), port of Italian Somaliland; pop. 10,000; trade with interior; fair harbor: pop. E-139
- Kise** (*kēs*), August (1802-65), German sculptor; well known for studies of animals ('Mounted Amazon Attacked by a Tiger').
- Kis'simnee River**, Florida, rises in lake of same name; flows s.e. 90 mi. to Lake Okechobee: map F-112
- Kisslgen** (*kis'ing-en*), Germany, famous spa in Bavaria, 60 mi. e. of Frankfurt-on-the-Main; pop. 9000; salt springs known from 9th cent.
- Kisu'mu**, Kenya Colony, a terminus of the Uganda Railway; on Lake Victoria; pop. 3000; the harbor portion is called Port Florence: map A-42a
- Kital Gorod** (Chinese city), part of Moscow M-284
- Kit-Cat Club**, famous 18th-century club in London including among members Addison, Steele, and other prominent writers and political leaders, all Whigs; named for tavern of Christopher Cat where meetings were held.
- Kitchen**
- colonial A-188-9, picture A-169
- equipment B-267, C-352, pictures C-251, B-267
- "Kitchen Cabinet," popular name applied to group of men who (although they held no important offices) influenced President Jackson J-179
- Kitchener** (formerly Berlin), Ontario, Canada, manufacturing city 60 mi. s.w. of Toronto; pop. 80,793; furniture, clothing: map, inset C-50b
- Kitch'ener of Khartum, Horatio Herbert Kitchener, Earl** (1850-1916), British general K-26, S-317
- Kitchener wheat**, picture W-82
- Kitchen middens**, refuse heaps of prehistoric settlements containing bones, shells, debris, and relics of industry and art; valuable in study of life of early peoples: M-48
- Kite K-26-8**
- airplane compared with K-28: experiments A-68
- box K-28: making, picture K-26
- China and Japan, kite-flying K-27, C-220-1
- former use by Weather Bureau K-26
- how to make and fly K-26, 28
- military use K-27
- safety in flying S-2g
- why a kite flies K-28, picture K-27
- Kite**, a bird of prey K-26, H-247, picture H-248
- Kite balloons**, or sausage balloons B-24, 31, picture B-27
- Kite's Day**, holiday in China K-27, C-220-1
- Kitskan** (*kit-ksān'*), a Chimmesyan Indian tribe living on upper Skeena River, British Columbia, Canada.
- Kitool**, a wood fiber B-250
- Kitson, Henry Hudson** (born 1865), American sculptor, born Huddersfield, England; executed many public monuments; won medals at many exhibitions; his wife, Theo Alice Ruggies Kitson (born 1871) also well-known sculptor.
- Kittatin'ny Mountains**, range of the Appalachians; in New York known as Shawangunk, in New Jersey as Kittatinny, in Pennsylvania generally as Blue but also as Kittatinny and North Mts.
- Delaware Water Gap D-42
- New Jersey N-89, map N-90
- Pennsylvania, map P-112
- Kitten ball** B-57
- Kittery Navy Yard**. See in Index Portsmouth Navy Yard (N.H.)
- Kittiwake**, a gull (*Rissa tridactyla*) which breeds in the Arctic regions and winters as far south as the Atlantic and Pacific coasts of the United States; it is about 18 inches long and has white plumage with a pale bluish-gray mantle; hind toe is entirely absent or rudimentary; named from its cry.
- Kittredge, George Lyman** (1880-1941), American educator and philologist, born Boston; graduated at Harvard and taught English there 1888-1936; became professor 1894; author of standard works on English grammar and philology.
- Kitson, Norman Wolferd** (1814-88), Canadian fur trader, born Chambly, Lower Canada; 1830 joined American Fur Company; 1844-54 maintained a trading post at Pembina on Red River and did much to break monopoly of Hudson's Bay Company.
- Kittul'**, a wood fiber B-250
- Kitty Hawk**, N. C., small village in n.e. on strip of land between Albemarle Sound and Atlantic Ocean where Wright brothers practised gliding and made first successful flight: W-184, A-69, picture A-89
- Kill Devil Hill**, national memorial N-22e
- Kiushu, Japan**. See in Index Kyushu
- Kiva** (*kē'vā*), ceremonial room of Indians in s.w. U.S. A-293
- Kiva, Lake**, or Kivu, Lake, in e-central Africa on e. border Congo State; 60 miles long: map C-331
- Kiwanis clubs**, organizations of busi-

ü=French u, German ü; gem, go; thin, then; ñ=French nasal (Jean); zh=French j (z in azure); x=German guttural oh

ness, professional, and agricultural men for the rendering of civic and social service to their communities. The first Kiwanis club was formed in Detroit in 1915, and Kiwanis International was organized in 1917. Each club is made up of two members of each business or profession in the community. The motto of Kiwanis is "We build."

Kiwi (*kē'wē*), or apteryx, primitive New Zealand bird, related to ostrich Z-222, picture Z-224
cloak from feathers, picture N-135 foot, picture B-129

Kiyon'ga (1742-1815), Japanese color-print artist; figures, scenes.

Kizil-Irmak (*kiz'il īr-māk'*) River (ancient name Halys), in Asia Minor, rises near border of Armenia and flows n. and w. into Black Sea; 600 mi. long: maps B-154, B-8

Kjerulf (*chē-rūlf'*), Halvdan (1815-88), Norwegian composer, famous for his songs ('Last Night'); also wrote piano compositions; influenced Norwegian national music.

Kjölen (*chū'len*) Mountains, or Kiolen Mountains, formerly Keel, between Sweden and Norway N-171, 174, map N-173

Klabund (*kli-bunt'*), pen name of Alfred Henschke (1891-1928), German author of lyrics, novels, dramas; in his short life made important contribution to German literature; among his plays are 'Kirohlütenfest' with Japanese setting and Chinese play 'Kreidekreis'; novels, mainly on historical subjects, include 'Mohammed', 'Fjotr', and 'Borgia'.

Klagenfurt (*kli'gēn-furt*), Germany, important manufacturing city in s. Oetmark (Austria); pop. 80,000; chief city of Klagenfurt region (800 sq. mi.) which voted to remain in Austria after 1st World War plebiscite area, map B-18

Klamath Falls, Oro., city at junction of Klamath and Lost rivers, 20 mi. n. of California line; in rich farming, dairying, and live-stock raising region; pop. 16,497; lumber and lumber products: map O-248

Klamath (*kli'māth*) Indians, a tribe occupying Klamath Indian Reservation (1860 sq. mi.) in s. Oregon.

Klamath River, 180 mi. long, rising in Upper Klamath Lake in s. Oregon and flowing through n. California into Pacific, map C-28

Klaproth (*kli'p-rōt*), Martin Heinrich (1743-1817), German chemist and mineralogist; his research led to discovery of uranium and zirconium.

Klar River, short stream in e. of Scandinavian peninsula; flows into Lake Wenner: map N-173

Klaus, Karl K. (1796-1864), Russian chemist and biologist, discoverer of ruthenium; investigated flora and fauna of Volga steppes.

Klausenburg (*kliu'sēn-burk*). See in Index Cluj

Kléber (*kli-bēr*). Jean Baptiste (1758-1800), French Revolutionary general, one of greatest of epoch; assassinated while subjugating Egypt.

Klebs (*kli'ps*), Edwin (1834-1918), pathologist, born Königsberg, Germany; professor at Bern, Würzburg, Prague, Zurich, and Rush Medical College, Chicago; known for work in pathology of infectious diseases; discovered diphtheria bacillus 1888.

Klee (*kli*), Paul (1879-1940), German-Swiss surrealist painter; one of leaders in Dadaistic movement; work suggestive of primitive art or child art.

Kleiber (*kli-bēr*), Erich (born 1890), Austrian orchestra conductor; general director Berlin Staatsoper; guest conductor New York Philharmonic Orchestra.

Klein, Julius (born 1886), American commercial expert, born San José, Calif.; studied history and economics in Europe and Latin America; taught at Harvard University; director U.S. Bureau Foreign and Domestic Commerce 1921-29; assistant secretary of commerce 1929-33.

Kleist (*kli'st*), Heinrich von (1777-1811), German romantic dramatist and poet, now given high rank, but not recognized during his life; committed suicide ('Penthesilea', tragedy; 'The Broken Pitcher', comedy; 'Michael Kohlhaas', story of time of Luther).

Klementans, a group of tribes in Borneo, whose members are generally intelligent and well built.

Klomm, French airplane, picture A-66

Klork, Mehel de (1884-1923), Dutch architect, identified with modern movement in the Netherlands; obtained decorative effects with brick and tile; especially noted for municipal buildings and a housing project in Amsterdam.

Klove (*kli'vā*), Germany, also Cleves, town in Rhine provinces of Prussia, near frontier of Holland; formerly cap. of duchy of Cleves; pop. 22,000; castle associated with the legend 'Knights of the Swan', immortalized in Wagner's 'Lohengrin'.

Klikitat (*klik'i-tāt*), a Shahaptian tribe of Indians in Washington state.

Klingor (*kling'ēr*), Friedrich Maximilian von (1752-1831), German dramatist, born at Frankfort-on-the-Main, Germany; important figure of the "Storm and Stress" (*Sturm und Drang*) period of German romanticism which was named from his drama of that title; other works: 'Die Zwillinge' (The Twins) and 'Fausts Leben, Thaten und Höllenfahrt' (Faust's Life, Deeds, and Journey to Hell).

Klinger, Max (1857-1920), German painter, sculptor, and etcher. His works are highly personal, subjective, morbidly imaginative, and in defiance of conventional forms. The sculptures 'Salome' and 'Cassandra' are typical. One of his most renowned works is statue of Beethoven, in marble, ivory, gold, platinum, and bronze.

Klon'dike, a gold-mining district in Yukon Territory, Canada K-29, Y-214

Klondike River, Yukon Territory, Canada K-29

Klopstock (*kli'p'stōk*), Friedrich Gottlieb (1724-1803), German epic, lyric, and dramatic poet; deeply religious and patriotic; sought to restore ancient German spirit; had great influence in his own time and is still venerated for his lofty seriousness, though little read today ('The Messiah'; 'Odes').

Kluck (*kli'k*), Alexander von (1848-1984), Prussian general and field marshal.

first battle of Marne W-154, M-66
Klutevskaya (*kli-ohāf'skā-yā*), or

Kluchef, active volcano in Kamchatka, Siberia; 16,130 ft.

Knapweed (*nāp'wēd*), a perennial plant (*Centaurea nigra*) of composite family, native to Europe but now common to North America. Grows to 2 ft.; leaves lance-shaped, to 6 in. long. Small flowers rose-purple. Also called hardheads.

Knee-jerk, a simple reflex R-63

Kneipp (*knip*), Sebastian (1821-97), German priest known for special water cure, which included walking barefooted in wet grass and on snow ('My Water Cure').

Kneisel (*knī'sēl*), Franz (1865-1928), violinist and musical conductor, born Bucharest, Rumania, of German parents; founder and first violinist of famous Kneisel Quartet.

Kneller (*nēl'ēr*), Sir Godfrey (1648-1723), court painter to Charles II and succeeding English sovereigns to time of George I; born Germany.

Knickerbocker, Diedrich, pretended author of Washington Irving's burlesque history of New York City. The Knickerbockers were an old Dutch family, and the name is now commonly applied to descendants of the original Dutch settlers of New York.

'Knickerbocker's History of New York', by Washington Irving.

Knife, as tool T-110-11, pictograph T-110a

Stone Age, picture S-293
use in camping C-45

Knife and fork K-33. See also in Index Cutlery

Knife edge, in weighing machines W-65

Knight, Charles R. (born 1874), painter and sculptor, born Brooklyn, N.Y.; favorite subjects animals and birds, prehistoric men and animals: pictures C-118, 119

Knight, Laura, English painter; specializes in portraying with charm and realism life of the stage and circus; wife of Harold Knight (born 1874), a portrait painter; made Dame Commander of the Order of the British Empire 1929.

Knighthood K-29-31, pictures K-29, 30

armor A-304
castle C-82-5

Froissart's 'Chronicles' F-209
heraldry H-281

King Arthur and his Round Table A-316-18, R-169-60; Sir Galahad G-1, picture K-30a

orders of knighthood D-35: crusading orders C-408-7, C-404; papal orders D-35

romances R-127: burlesqued by Cervantes C-136

title and rank D-34
tournaments K-30-1

Knights Hospitallers of St. John (crusading order) C-406, 407

Malta, Knights of M-43, C-407: shield F-98, color plate F-89

Rhodes, Knights of R-99: shield F-98, color plate F-89

shield F-98, color plate F-89
Tripoli L-121b

Knights of Columbus, Roman Catholic fraternal organization K-31

Knights of Labor, U.S. L-44-44a, P-283

Labor Day L-45

Knights of Malta, crusading order, originally Knights Hospitalere of St. John M-43, C-407

shield F-98, color plate F-89

Knights of Pythias, fraternal society D-10

Knights of Rhodes R-99
shield F-98, color plate F-89

Knights of St. Gregory, order of
knighthood under patronage of St. Gregory I, founded 1631 by Pope Gregory XVI, originally to reward service of citizens of Church states; now granted to members of any faith or country whose services benefit the Vatican and religion.

Knights of St. John, or Hospitalers.
See in Index Knights Hospitalers of St. John

Knights of the Golden Circle C-256

Knights of the Round Table R-159-60, A-315-16
Galahad G-1, pictures A-315, 316, K-302
'Idylls of the King' T-52: quoted R-162
King Arthur A-315-16
Lancelot G-1, picture L-119

Knight's tale, in 'Canterbury Tales' C-161

Knights Templar, a Masonic order;
based on traditions of the crusading order; membership open only to Masons who have taken Royal Arch degree.

Knights Templars (crusading order) C-406, 404
bankers B-43
Temple in London L-167

Knlpe, Emille Benson (born 1670),
American author and illustrator, born Philadelphia, Pa.; with her husband, Alden Arthur Knlpe, depicts American historical scenes in fiction for girls ('Maid of '76'; 'Lucky Skpence'; 'Maid of Old Manhattan').

Knlphofia (nlp-hô'fi-â), a genus of
perennial plants of the lily family, native to Africa. Root is a bulb; leaves long, grasslike; flowers small, tubular, densely clustered at top of smooth, tall stem, shading from yellow to orange, or coral, rarely white; also called tritoma, red-hot-poker plant, torch-lily, or flame-flower.

Knitted goods K-31, 33, T-71

Knitting machine K-31-3
Jacquard attachment S-259

Knobstone Escarpment, in Indiana I-45

Knockout, in boxing B-208
"Knockout drops," name given to certain hypnotic drugs N-12

Knossus, Crete. See in Index
Knossus

Knot, a nautical unit for measuring
a ship's speed L-179, table W-67

Knot, a sandpiper S-173

Knotroot. See in Index Stachys

Knots, litches, and splices K-33-7
used in rug making R-172

Knotty pine. See in Index Lodgepole pine

Knotweed, jointweed, or smartweed,
common trailing weeds comprising the genus *Polygonum* of the buckwheat family; jointed stems, long grasslike leaves, and small white, rose, or green flowers.

Knowles, Lucius James (1819-84),
American inventor, born Worcester, Mass.; devised a safety steam boiler feed regulator, several models of steam engines, and many loom improvements.

Know Nothing party, U.S. P-292
"Know then thyself, presume not God to scan" (Pope) P-303
"Know thyself," the motto of Socrates.

Knox, Henry (1750-1806), American
Revolutionary general, born Boston; commander of artillery forces; trusted adviser of Washington, and

directed many successful operations for him; started military school which later became West Point; secretary of war (1785-94), first under Continental Congress, later under Washington as first president.

Knox, John (1505?-72), Scottish
Protestant leader K-37
Edinburgh house and church E-156
"Knoxian" Puritans P-369

Knox, John Jay (1828-92), American
financier; author of Coinage Act of 1873 which dropped silver dollar from coinage; had been comptroller of the treasury and president National Bank of the Republic.

Knox, Philander Chase (1853-1921),
American lawyer and statesman, born Brownsville, Pa.; U.S. attorney general 1901-04 under McKinley and Roosevelt; secretary of state 1909-13 under Taft; senator from Pennsylvania after 1913
Roosevelt and the trusts R-151

Knox, Rose Bell (born 1879), author
of children's books; born Alabama; authentic stories of life in the South ('Boys and Sally down on a Plantation'; 'Footlights Afloat').

Knox, (William) Franklin (born 1874),
American newspaper man and politician, born Boston, Mass.; editor and publisher the *Chicago Daily News*; Republican nominee for vice-president of U.S., 1936; appointed secretary of the navy in F. D. Roosevelt's cabinet 1940.

Knox College, at Galesburg, Ill.;
founded 1837; non-sectarian; arts and sciences; Lombard College merged with it 1930.

Knox College, Toronto, Canada. See
in Index Toronto, University of

Knoxville, Tenn., city in e. on Tennessee
River, distributing point for surrounding agricultural region; pop. 111,580; entrance to Great Smoky Mountains National Park is near by; offices of Tennessee Valley Authority are here. James White, Revolutionary War captain, was first permanent settler on site of city in 1786. William Blount, governor of the "territory south of the Ohio," made this his headquarters. Town was laid out 1792 and named after Gen. Henry Knox. First capital of Tennessee (1796-1812, 1817-19). Scene of desperate fighting during Civil War. Governor Blount's mansion is now a museum; McClung collection of history and genealogy of southern states is housed in Lawson McGhee Library. University of Tennessee, Knoxville College for Negroes: T-44-5, map T-46 state university, picture T-47

Knobel, Frederick Hermann (born 1870),
American Lutheran clergyman, born New York City; founder and pastor Church of Atonement, New York City; president United Lutheran Church in America.

Knudsen, William S. (born 1880),
American industrial executive, born Denmark; removed to New York 1900; president General Motors 1937-40; appointed member National Defense Advisory Commission 1940; made member of War Production Board, 1942, in charge production for War Dept.

Knurl, a tool T-110

Knut (knpt), Cnut, or Canute (994-1035),
king of Danes and Norwegians, ruler of England 1016-35 C-79

Koa (kô'â), a tree (Acacia koa)
found in Hawaii; timber valuable for building and cabinetwork; bark used in tanning.

Koala (kô-û'la), a tree-dwelling Aus-
tralian marsupial about 2 ft. long K-2, A-372, picture Z-224
food of, in captivity Z-223

Kobe (kô'bô), or Hogo-Kobe, Japan,
important seaport in s. of island of Honshu, 20 mi. w. of Osaka; twin port with Osaka; pop. 970,000; silk trade; shipbuilding, metal and rubber mfrs.: O-252, maps J-186, A-332b

Köbenhavn (kô-bên-háv'n), Danish
name of Copenhagen. *See in Index* Copenhagen

Koerberger, or Koburger, Anton
(1440?-1513), German printer-publisher; introduced printing in Nuremberg; established agencies in all parts of Europe to sell books; developed style of book binding still associated with name: T-173-4 books printed by others B-190

Koblentz, Germany. See in Index
Coblentz

Ko'hold, or gnome, in German folk-
lore, a teasing, mischievous elf F-3 cobalt named for C-290

Kocaeli (kô-jâ-â'le), Turkey. See in
Index Nicomedia

Koch (kôk), John Peter (born 1870),
Danish Arctic explorer; 1912-13 led expedition over inland ice of Greenland route, map G-176

Koch, Karl (1809-79), German bota-
nist and traveler; professor of botany University of Jena; made scientific researches in Russia, also in the Orient.

Koch, Robert (1843-1910), German
physician and bacteriologist; studied tuberculosis, cholera, and tropical fevers; originated tuberculin treatment; 1905 Nobel prize winner in medicine

anthrax germ discovered by G-76

Kochanowski (kô-kâm-ô'f'skô), Jan
(1530-84), Polish humanistic poet; wrote in Latin and Polish; contributed greatly to development of his native language; translation of Psalms in verse considered finest in Polish.

Kocher (kôk'er), Emil Theodor
(1841-1917), Swiss surgeon, first to operate successfully for exophthalmic goiter; 1909 Nobel prize winner in medicine.

Koehia (kô'ki-â), an annual plant of
the goosefoot family, native to Eurasia. Grows 1 to 5 ft. high, forming an oval or pyramidal plant of bright green which turns, in one variety, to brilliant scarlet in autumn; leaves and flowers tiny. Also called burning-bush, belyedera, and summer-cypress but not to be confused with the true burning-bush, a spindle-tree. *See in Index* spindle-tree

Kodachrome, in photography P-186

Kodak, trade name for a camera. See
in Index Camera

Kodály (kô-dâ'yô), Zoltán (born 1882),
Hungarian composer; professor theory and composition at Budapest Academy of Music after 1907; intense interest in Hungarian and Slovak folk-songs; own works, which are modern and original, often contain folk-song material; symphonies, chamber, and piano music.

Kodiak (kôd-yâk') bear B-69

Kodiak Island, or Kodiak Island, off
coast of Alaska, s. of Cook Inlet; 100 mi. long and 50 mi. wide; salmon fisheries; growing agricultural and grazing industries; U.S. naval base; chief town Kodiak (pop. 864): A-102, map A-105
Russian outpost in 1784 A-103

Kodok, formerly *Fashoda*, town in Anglo-Egyptian Sudan, on upper Nile; occupation by French 1898 (the "Fashoda incident") angered British; adjustment led to mutual support of the two countries in African affairs; renamed *Kodok* 1904; map E-197

Koehl (*köl*), Hermann (1888-1938), German aviator A-74, picture A-73

Koenig (*könig*), Friedrich (1774-1833), German inventor P-348

Koga, Mineichi (born 1885), Japanese admiral; succeeded Yamamoto as commander in chief of the navy, 1943; had important rôle in seizure of Hong Kong and the Philippines.

Kohinoor (*kō-i-nūr*), a famous diamond among English crown jewels D-62, L-184, pictures D-62, 63

Köhler (*köhler*), Wolfgang (born 1887), psychologist, chief exponent of Gestalt School, and investigator into animal behavior P-362

Kohlrabi (*köl'rä-bi*), vegetable of the cabbage type C-1, picture C-2 when and how to plant G-13

Kokand (*kō-känd*), U.S.S.R., trade center in Uzbekistan 350 mi. e. of Bokhara; pop. 85,000; map A-332b

Ko'komo, Ind., manufacturing city on Wildcat River, 50 mi. n. of Indianapolis; pop. 33,795; iron, steel, and brass products, stoves, automobile accessories; map I-48

Koko Nor, lake in central Asia, in n.e. Tibet A-324

Kokoshka (*kō-kōsh'kō*), Oskar (born 1886), Austrian modernist painter, identified with German expressionists; first painted portraits, later vigorous, landscapes.

Kok-saghyz, Russian dandelion, source of rubber R-169a

Koksoak River, in n.e. Quebec; flows into Ungava Bay; map C-50c

Kola nut, See in *Index* Cola nut

Kola Peninsula, a mountainous peninsula of Russia between the Arctic Ocean and the White Sea; 50,000 sq. mi. It is n. coast, called the Murman Coast, has several ice-free ports

Murman Coast R-179

Kolbe (*köl'bē*), Georg (born 1877), German sculptor; best known for small bronze figures, simple and severe in design, suggestive of ideal Greek sculpture.

Kolchak (*köl-chāk*), Vladimir V., Admiral (1875-1920), former Imperial Russian naval officer; headed Omsk government (November 1917-January 1920), recognized by Supreme Council as *de facto* Russian government; organized Siberian anti-Bolshevik army

anti-Bolshevik leader W-174, 175

Kolln (*köl'ēn*), Germany, Bohemian town on Elbe River, 80 mi. e. of Prague; pop. 19,000; Austrians defeated Frederick II of Prussia (1757), securing evacuation of Bohemia.

Kolln'sky, name given to the fur of a weasel found in Siberia and China; used in furriery; hair short, color dark brown; trade names red sable, Siberian mink, tartar sable.

Kölln (*köln*), medieval German city, now a part of Berlin B-99a

Köln (*köln*), Germany. See in *Index* Cologne

Kol Nidre (*köl nīd'rā*), song of the Jewish religious ritual, sung at evening service on the Day of Atonement (Yom Kippur); written in Aramaic; opening words, Kol Nidre, mean "All vows."

Kol'okol, *Ozar*, the great bell in the

Moscow Kremlin B-93, pictures B-93, M-264

Kolozsvar. See in *Index* Cluj

Koltsof (*kōlt-sōf*), Alexis Vasilevitch (1808-42), Russian lyric poet, called the "Russian Burns"; author of numerous songs and ballads in the style of the folk-songs.

Komárno (*kō'mär-nō*), Hungary, also Komárom or Komorn, town on Danube River 50 mi. s.e. of Bratislava; pop. 18,000; surrendered to Austrians (1849) after brilliant defense in Hungarian revolution; grain and timber trade.

Komen'ski, or Comenius, Johann Amos (1592-1670), Moravian bishop and educator E-179

picture book for children L-157

Kommander Islands, or Commander Islands, group of islands in Bering Sea, belonging to Russia

fur seals S-69

Komo'do, small island in East Indies between Sumbawa and Flores

giant lizard L-171; discovery E-348

Kom'roff, Manuel (born 1890), American novelist, born New York City; his romantic novel "Coronet" traces decline of aristocracy from 17th century to modern times; also wrote "The Grace of Lambs", short stories, and "Juggler's Kiss", novel.

Komsomolsk, city in e. Siberia on Amur River; coal and iron and steel; pop. 70,000; map A-332b

Kondouriotis, or Condouriotis (*kōn-dōr-e-ō'tis*), Paul (1855-1935), first president of Greek Republic (1924-29); commander Greek fleet, Balkan War 1912-18.

Kondylls (*kōn-dē'lls*), George (1880-1936), Greek general and politician; overthrew Pangalos government by coup d'état, 1926, but resigned in same year.

Ko'nel, an alloy A-133

Kongo. See in *Index* Congo State

Königgrätz (*kō-nīk-grēts'*), Germany, Czech Hradec Králové (*hrá-děts krá'lo-vā*), city of Bohemia, 65 mi. e. of Prague; pop. 35,000; 13th-century cathedral; varied manufactures; Sadova, or Königgrätz, battlefield (1866) in Austro-Prussian War near by

results of battle G-73

Königsberg (*kō-nīks-bērk*), Germany, fortified seaport, cap. of East Prussia, on Pregel River, 4 mi. from mouth; pop. 340,000; varied manufactures; famous university; bombarded by Russians in 1914; G-67, map G-66

Königshütte (*kō-nīks-hūt-tū*), Silesia. See in *Index* Krolewska Huta

Konoye (*kō-nō-ē*), Prince Fumimaro (born 1891), Japanese statesman; as premier of Japan 1937-38 and 1940-41, largely responsible for fascist policies in Japan.

Konstanz, Germany, or Con'stance, city of Baden on Lake Constance at efflux of Rhine; pop. 26,000; one of oldest towns in Germany; many fine old buildings; map S-351

Kon'ti, Isidore (1862-1938), American sculptor, born Vienna; monumental decorative work for Chicago World's Fair (1893), and other expositions.

Konya (*kō'nē-ā*), Turkey, city in Asia Minor about 150 mi. s. of Ankara; pop. 52,000; ancient Iconium; became Seljuk capital 1097; taken by Frederick Barbarossa 1190; annexed to Turkey in 16th century; famous medieval orchards; carpets, textiles; map A-332b

Koo'doo, or Kudu, one of the largest of African antelopes, having a

white stripe down the back and 8 or 10 vertical stripes descending from it down the sides; male has long horns twisted into an open spiral.

Kookaburra (*kuk'ā-būr-ā*), an Australian bird A-372

Koort (*kōrt*), Jan (born 1888), Estonian sculptor in granite, marble, and wood; works include sculptures in memory of the dead in Estonian War of Independence; finely executed character heads.

Koos, Leonard Vincent (born 1881), American educator, born Chicago; professor of secondary education, University of Minnesota, 1919-29, University of Chicago since; made important studies of the junior college ("The Junior High School"; "The Junior College").

Kootenay Indians, or Kutenai Indians, two tribes of the Kitunahan stock, one living in Montana, the other in British Columbia.

Kootenay National Park, a Canadian park in s. British Columbia N-23

Kootenay River, tributary of Columbia River; 400 mi. long, rises in Canadian Rockies, flows s. into Montana and Idaho and back into British Columbia through wild picturesque region; B-246

Ko'peck, Russian minor coin; a hundredth part of a ruble.

Koran, sacred book of Mohammedans K-38, M-214

children learning, picture E-186

influence on Arabic language A-242

Korçë (*kōr'chē*), also Koritsa, town in s.e. Albania; pop. 28,000; in fertile agricultural region.

Korcula. See in *Index* Curzola

Kordofan (*kōr-dō-fān*), a province in Anglo-Egyptian Sudan, Africa; about 147,100 sq. mi.; pop. 1,250,000; cap. El Obeidi; fine gum forests.

Kore'a, or Chosen, also Tyosen, peninsula of e. Asia between the Sea of Japan and the Yellow Sea; 84,738 sq. mi.; pop. 23,000,000; a province of Japanese Empire; cap. Seoul; K-38-40, maps J-188, A-332b

ginseng G-88

history K-38, 40: Russo-Japanese War R-198

kite flying K-27

Korea, Strait of, separates Korea from rest of Japan and unites Sea of Japan with East China Sea; Russian naval power destroyed here by Japanese in 1905.

Korln (*kō'rīn*), Ogata (1658-1716), Japanese painter and lacquerer; work superbly decorative and graceful; excelled in idealized flower studies; used white metal and mother-of-pearl in lacquers ("Waves at Matsushima", screen in Boston Museum).

Korln'thos, Greece. See in *Index* Corinth

Koritsa (*kō'rēt-sā*), Albanian Korçë, town in s.e. Albania; pop. 23,000; in fertile agricultural region.

Korn, Arthur (born 1870), German scientist I-117

Körner (*kūr'nēr*), Karl Theodor (1791-1813), German poet and patriot; roused his countrymen by his patriotic songs; died fighting against Napoleon.

Kornfeld, Paul (born 1889), German writer of expressionistic plays ("The Seduction"; "Heaven and Hell").

Korngold (*kōrn'gōlt*), Erich Wolfgang (born 1897), Austrian composer, born Brünn (now in Germany); showed remarkable precocious talent; at age of 11

composed opera 'The Snowman', produced in Vienna; later works for orchestra, stage, and piano showed development in command of material ('Sinfonietta' for orchestra; 'Die Töte Stadt', opera).

Kor'nilof, Laurus Georgievich (1870-1918), Russian general, commanded in Galician campaign during 1st World War; his unsuccessful mutiny against Kerevsky (1917) prepared way for later Bolshevik victory; killed in battle against Red army while leading Volunteer army in "Ice flight" in the Kuban.

Koroseal, a synthetic plastic P-246

Kortrijk, Belgium. *See in Index* Courtrai

Korzenilowski (*kō-shēn-yōff'ski*), Teodor Josef Konrad, original name of Joseph Conrad C-341

Kos, or **Cos** (*kōs*), island in Aegean Sea, w. of Asia Minor; area 111 sq. mi.; pop. 20,000; settled by Dorian Greeks in ancient times, became famous for healing springs and temple of Aesculapius; birthplace of Apollon and Hippocrates; important archeological findings; ceded by Turkey to Italy after 1st World War; exports grapes and sultana raisins.

Kosciusko (*kōs-ū-s'kō*), or **Kosciuszko**, Thaddeus (1746-1817), Polish general and patriot K-40 monument at Cracow, *picture* F-276 statue at West Point M-172

Kosciusko, Mount, in Australian Alps, New South Wales, highest peak in Australia (7328 ft.).

Kosher (*kō'shēr*), Jewish term for food made ceremonially clean according to Mosale law; especially applied to meat slaughtered in a way insuring complete bleeding.

Koshtantau (*kōsh-tān-tōu'*), Mount, one of highest peaks in Caucasus range (16,875 ft.).

Košice. *See in Index* Kassa

Kos'loff, Peter K. (1868-1985), Russian archeologist; discovered remains of a forgotten empire in Mongolia in 1928.

Kosovo (*kō'sō-vō*), Yugoslavia, also Polje, plain in s.w. near Prizren battle (1889) T-162

Kos'suth, Louis (1802-94), Hungarian patriot K-40-1

Kostelanetz, André (born 1901), American orchestra conductor, born in Russia; came to United States 1922; married Lily Pons, soprano; won popularity as orchestra conductor for Columbia Broadcasting System.

Kos'ter, Laurens Janszoon. *See in Index* Coster, Laurens Janszoon

Koto (*kō'tō*), a Japanese harp consisting of a long box over which are stretched 13 strings, each with a bridge; played with both hands and tuned by shifting the bridges.

Kotor (*kō'tōr*), Yugoslavia, or **Cattaro**, fortified town on Gulf of Kotor, inlet of Adriatic; pop. 5000, excellent harbor: *maps* A-381, B-18

Kotor, Gulf of, or **Cattaro**, Gulf of, on Adriatic, *picture* Y-213

Kotzebue (*kō'tsū-bū*), August Friedrich von (1761-1819), German playwright, extraordinarily prolific and popular all over Europe; best-known play translated as 'The Stranger'.

Koumiss, or **kumiss**, a fermented drink made from milk M-173

Koussevitsky (*kō-sē-vē't'skē*), Serge (born 1874), Russian-American musical conductor, born Tver, Russia; first became known as double-

bass soloist in Imperial Theatre Orchestra; organized own orchestra and made concert tours; conducted orchestras in most of the European countries; conductor Boston Symphony Orchestra since 1924.

Kovalevsky (*kō-vā-lēf'skē*), Sonya or Sophie (1850-91), Russian mathematician, genius in mathematical treatment of mechanical and other problems; professor of mathematics, University of Stockholm, Sweden, 1884 until death.

Kovno (*kōv'nō*), Lithuania. *See in Index* Kaunas

Kowelt (*kō-wāl'*), Kuwelt, or Kuwait, sheikdom, under British protection, in n.e. Arabia, on n.w. coast of Persian Gulf; about 1980 sq. mi.; pop. 50,000; exports pearls, horses, wool; cap. and seaport, Kowelt: A-237, 238, *maps* A-242, A-322b-c

Kowloon, small peninsula and port of China opposite Hong Kong H-332, 333, *picture* H-214

Kowtow (*kō-tōu'*), origin of term C-221j

Kozak, a Russian folk-dance, *picture* F-133

Kraais (*krāle*), native villages in Africa, *pictures* A-35, 40, S-200

Kraepelin (*krā'pē-lin*), Emil (1856-1927), German psychiatrist, professor at University of Munich; revised classification of mental diseases; analyzed fatigue process.

Krafft (*krāft*), or **Kraft**, Adam (about 1455-1509), principal German sculptor of late Gothic period; work robust, picturesque, and realistic: S-58

Kraft paper P-61, P-220

Krait (*krāt*), or **Crait**, a snake S-171

Krajova (*krā-yō'vā*), or **Craiova**, Rumania, trading and manufacturing town 110 mi. w. of Bucharest; pop. 75,000: *map* B-18

Krakatau (*krā-kā-tō'd*), small volcanic island in East Indies between Java and Sumatra eruption of (1883) V-332, F-106d

Kraków, Poland. *See in Index* Cracow

Kranach (*krū'nāk*), Lucas. *See in Index* Cranach

Krasnodar (*krās-nō-dār*), Russia, formerly Ekaterinodar, fortified city of n. Caucasus on Kuban River 90 mi. e. of Black Sea; pop. 205,000; farming, cattle-raising, and fishing interests: *map* E-326e

Krasnoyarsk (*krās-nō-yārsk'*), U.S.S.R., Siberian city on Yenisei River and Trans-Siberian Railroad; pop. 190,000; center of gold washings of Yeniseisk district: *map* A-332b

Krasin (*krās'in*), Leonid B. (1870-1927), Russian politician; soviet delegate to various international conferences; diplomatic representative at Paris, then London.

Kratzer, Nicholas, astronomer to Henry VIII of England, *picture* H-318

Krefeld (*krā'fēlt*), Germany, also Crefeld, manufacturing town in Prussia, 30 mi. n.w. of Cologne; pop. 170,000; famous technical school: G-69

Krehbiel (*krā'bēl*), Henry Edward (1854-1923), American musical critic and writer, born Ann Arbor, Mich.; musical critic Cincinnati *Gazette* 1874-80, New York *Tribune*, 1880-1923; known as "dean of American critics" ('How to Listen to Music'; 'Chapters of Opera').

Kreisler (*kris'lēr*), Fritz (born 1875), Austrian violinist and composer, born Vienna; through his artistry, his musical grace and sensibility

became favorite in all parts of world; served in army in 1st World War and was wounded at Lemberg; returned to concert stage; composed songs, violin pieces ('Caprice Viennois'), and an operetta ('Apple Blossoms').

Krem'lin, citadel of Moscow M-264, *pictures* M-283, 264, R-187, 189 Czar Kolokol bell B-93

Kremnitz, Mite, lady-in-waiting to Elizabeth, queen of Rumania (Carmen Sylva) R-176

Krenek, Ernst (born 1900), Austrian composer of Czech descent, born Vienna; extreme modernist in style; won first widespread fame with 'Jonny splett auf', jazz opera; followed this with other operas, including 'The Life of Orestes'.

Kresge, S. S., Company, 5-and-10 chain store, started 1897 in Detroit by S. S. Kresge.

Krētē. *See in Index* Crete

Kreutzer (*krōit'sēr*), Rudolph (1766-1831), French violinist of German extraction; friend of Beethoven, who dedicated to him his 'Kreutzer Sonata'.

Kreuzotter (*krōit'sēt-ēr*), a viper V-303

Kreymborg (*krām'bōrg*), Alfred (born 1883), American poet, born New York City; founded *The Globe and Others*, magazines of free verse; "a whimsical radical" ('Apostrophes', 'Mushrooms', 'Plays for Merry Andrews', 'Our Singing Strength'); also wrote radio plays.

Kriemhild (*krēm'hilt*), in the Nibelungenlied, wife of the hero Siegfried S-141, N-140

Kriemhilde Line (in 1st World War), German defensive position in Meuse-Argonne region A-232

Krim, Mohammed ben Abd el (born 1888?), Riffian chief M-260

Krim, or **Crimea**, peninsula jutting southward from Russia into the Black Sea C-397-8, *map* E-326e

Krimmer, a curly gray fur from lambs and sheep raised on the Crimean Peninsula.

Kris, Malay dagger, *picture* S-358

Krish'na, a Hindu god H-293

Kris Kringle, a corruption of German Christ Kindlein, 'the little Christ Child'; supposed to bring Christmas gifts C-229a

Kristensen, Leonard, Norwegian whaling captain; with C. E. Borchgrevink first to land on Antarctic Continent (1895).

Kristin Lavransdatter, heroine of a trilogy of novels with medieval setting by Sigrid Undset ('The Bridal Wreath', 'The Mistress of Husaby', 'The Cross').

Kristleder (*krist'le-dēr*), German Christmas carols C-227

Krivoi Rog (*krē-vōi' rōg'*), Russia, town in Krivoi Rog district in s. Ukraine; pop. 200,000; iron and steel center: K-15, *map* E-326e

Kroger, Bernard Henry (1860-1938), banker and grocer, born Cincinnati, Ohio; founded Kroger Grocery and Baking Co. (1882) which developed into a chain of grocery stores.

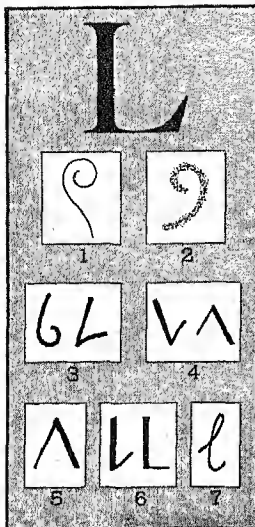
Krohg (*krōg*), Christian (1852-1925), Norwegian painter and author; depicted sea and seamen with realism and strength; his literary works include novels and books on art.

Krolewska Huta (*krō-lēf'skā hū'tā*), Polish city in s.w. Silesia, 170 mi. s.w. of Warsaw; iron works; center of coal and metal mining; called

- Königshütte by Germans, who occupied it in 1939; pop. about 100,000.
- Kroll, Leon (born 1884), American painter, born New York City; simple, strong, and highly individual in both landscape and figure work.
- Krona (*krō'nā*), the monetary unit of Sweden and Iceland; nominal value about 27 cents.
- Kronborg Castle, Denmark C-355
- Krone (*krō'nē*), the monetary unit of Denmark and Norway; for values see in *Index* Money, table. Also various former gold coins of central Europe; Austrian was worth about \$6.64, German about \$2.38.
- Kronos (*krō'nōs*), or Cronus, in Greek mythology, Titan ruler of universe U-261
- Kronstadt (*krō'n'shtdt*), Rumania. See in *Index* Brasov
- Kronstadt, Russia, port and naval base on island of Kotlin in Gulf of Finland 20 mi. w. of Leningrad; founded 1710 by Peter the Great.
- Kroo, African tribe. See in *Index* Kru
- Kroon (*krō'n*), the monetary unit of Esthonia; nominal value about 26½ cents.
- Kropotkin, Peter, Prince (1842-1921), Russian geographer and anarchist; first to show that structural lines of the Asiatic continent run s.w.-n.e.; exiled and imprisoned for advocating peaceful anarchy anarchistic doctrine C-325
- Kru, also Kroo, or Croo, a Negro people base on Liberia and adjacent parts of w. Africa; famous as canoe men and sailors; have tribal mark, black or blue line, tattooed down the forehead.
- Kruger (*krū'gēr*), Paul (1825-1904), Boer patriot, known as "Oom Paul" (Uncle Paul); president of South African Republic (Transvaal) 1889-1901
- "Afrikaner Bond" organized S-202
- Boer War B-147
- Kruger National Park, Union of South Africa N-23
- Krupp (*krūp*), Alfred (1812-87), German "cannon king," discoverer of method of casting steel in large pieces; made great guns used (1870-71) in the siege of Paris.
- Krupp, Friedrich (1787-1828), German iron-master founder of house of Krupp and of great Krupp works at Essen; introduced manufacture of cast steel into Germany; died in poverty: E-304
- Krupp, Friedrich Alfred (1854-1902), son of Alfred and grandson of Friedrich; handed on the Krupp business to his daughter, Bertha.
- Krupp Steel Works E-304, picture G-70
- Krupp von Bohlen and Halbach, Bertha (born 1888), eldest daughter of Friedrich Alfred; brought up to manage Krupp works, which she inherited at age of 18; married 1906 Baron von Bohlen and Halbach, who was then made chief director of Krupp works.
- Krutch, Joseph Wood (born 1893), American critic and essayist, born Knoxville, Tenn.; drama critic and associate editor *The Nation* 1924-32, literary editor 1933-37; English professor Columbia University since 1937 ('Edgar Allan Poe: A Study in Genius'; *The Modern Temper*; *The American Drama since 1918*).
- Krylov (*krū-lōf*), Ivan Andreevitch (1768-1844), noted Russian fabulist; wrote fables in language of peasants, satirizing untidiness, greed, etc., of ordinary life.
- Krypton, a colorless, odorless gas belonging to the helium group of inert elements, table C-188
- contained in air A-61
- lightness of gases compared G-18
- Kshatriyas (*shā-trē'yās*), a Hindu caste H-293, I-36
- Kuang-Hsu. See in *Index* Kwang-Su
- Kuan hua, official language of China, also called Mandarin C-221/
- Kuanza (*kuān'zā*), or Coanza, River, in Angola in w. Africa flowing into Atlantic; navigable 100 miles, total length 700 miles: map C-331
- Kuban' River, 500 mi. long, flows across w. half of n. Caucasia and receives many affluents from Caucasus Mts., map B-154
- source, picture R-185
- Kubelík (*kūb'ēl-ēk*), Jan (1880-1940), Bohemian violinist; popular concert virtuoso; debut at Prague and Vienna 1898; successful tours in Europe and U. S.; brilliant dexterity.
- Kublai Khan (*kū'bū kân*) (1216-94), one of greatest, most intelligent, and most cultured of Mongol rulers, grandson of Genghis Khan M-223
- completes Grand Canal, China C-87
- Marco Polo visits P-298
- Kudu. See in *Index* Koodoo
- Kudzu-vine, a perennial twining climber (*Pueraria thunbergiana*) of the pea family, native to China and Japan. Leaves in 8 parts; flowers in purple clusters; grows to 70 ft., hence called Jack-and-the-bean-stalk vine. Roots used in medicine and as starch source; inner bark used in cloth, and leaves as forage.
- Kuen Lun (*kuēn lūn*) Mountains. See in *Index* Kunlun Mountains
- Kufara, also Kufur or Oufra, group of five oases in Sahara Desert in e. Libya; 7000 sq. mi.; pop. 6000 nomads; town of Kufara on caravan route: L-121a, map A-42a
- Kühlmann (*kūl'mān*), Richard von (born 1878), German diplomat; secretary of state for foreign affairs 1917-18, negotiating treaties with Russia and Rumania; opposition of higher command of army and Chancellor Hertling, caused him to resign.
- Kuhn, Walt (born 1877), modernist painter, born New York City; simple, positive design; brilliant often raw color; noted for paintings of women of stage and circus, also of flowers.
- Kutbishev (*kūb'ē-shēf*), also Samara, U.S.S.R., port on Volga and Samara rivers 525 mi. s.e. of Moscow; pop. 390,000; flour milling; large trade; temporary Soviet capital in 2d World War: map E-328e
- Ku K'ai-chih (*kū'k'oi*) (850?-412), Chinese painter; remarkable expression with minimum detail; sure, rhythmic line; best known for a series of paintings on silk in British Museum, illustrating an essay 'The Admonition of the Instructress in the Palace'.
- Kukawa (*kū'kū-wā*), also Kuka, town in n.e. corner of Nigeria, Africa, near Lake Chad; pop. 50,000; slave-mart previous to 1894.
- Ku Klux Klan (*kū klūks*) Klan, secret society organized at Pulaski, Tenn., by Southern whites at the close of American Civil War C-257
- Ku Klux Klan, Knights of, society founded in 1915 by William J. Simmons, admitting only native-born, white, Protestant, American citizens; founded in Georgia, but spread to every state in the Union.
- Kukri (*kū'krī*), a sword S-359, picture S-358
- Kulaks, well-to-do Russian peasants R-192
- Kulanapan (*kū-lū'nā-pān*), a linguistic stock of Indians comprising the Pomo groups of w. cent. California.
- Külek Boguzi, or Cilician Gates, famous pass through Taurus Mts. in Asia Minor.
- Kumasi (*kū-mās'i*), or Coomassie, cap. of Ashanti, Gold Coast, w. Africa; pop. 36,000: map A-42a
- "Kumi," Japanese game P-250
- Ku'miss, or koumiss, a fermented drink made from milk M-173
- Kumquat, a small citrus fruit of the genus *Fortunella* O-240, L-138
- Kun, Bela (*bā'lā kōn*) (born 1886), Hungarian leader, of Jewish parentage; captured by Russia in 1st World War, he became follower of Lenin; organized revolution in Hungary and set up a soviet rule; overthrown after a few months; became member of executive committee, Communist International.
- Kunersdorf (*kū'nērs-dōrf*), village in Prussia, 4 mi. n.e. of Frankfurt-on-the-Oder; Prussians defeated by Russians and Austrians 1759 (Seven Years' War).
- Kung, H. H. (born 1881), vice-president of executive department of National, or Kuomintang, government of China, and concurrently minister of finance and governor of Central Bank of China. See also in *Index* Soong
- Kunishi (*kū-nī-yō'shī*), Yasuo (born 1893), Japanese painter and lithographer, identified with modernists; in U. S. after 1900.
- Kunlun Mountains, also Kuen Lun Mountains, in central Asia on n. border of Tibet; highest peak estimated 25,000 ft.: A-325, C-210, map C-211
- Kunming, manufacturing city in Yunnan province, China; n.e. terminus of Burma Road: map C-212
- Kunz, George F. (1856-1932), American gem expert, born New York; research curator of precious stones, American Museum of Natural History
- kunzite named for G-28
- Kunzite (*kūnts'it*), a semi-precious stone found in California and Madagascar; phosphorescent after exposure to radium: G-28, M-184
- Kuomintang (*kūō-mīn-tāng*), name for the Chinese Nationalist party, meaning literally "The People's Party" upholding principles of Dr. Sun Yat-sen—nationalism, democracy, and livelihood for the people: C-221, m. n. C-186
- Kuprin (*kū'prīn*), Alexander Ivanovitch (1870-1938), Russian writer of novels, short stories, sketches; power undisciplined by formal literary education ('The Duel', 'Sasha', 'Yama').
- Kur, principal river of Transcaucasia, flowing s.w. 820 mi. into Caspian Sea; navigable for 350 mi. from mouth.
- Kurbash, or courbash, a whip of heavy hide; term also applied to forced labor under the lash, outlawed in Egypt under British rule.
- Kurdistan, mountainous region in s.e. Turkey, n. Iraq, and n.w. Persia K-41
- Kurds, Mohammedan tribes of Asia Minor K-41
- Persia P-131

Key—cāpe, āt, fār, fāst, whāt, fūll; mē, yēt, fērn, thēre; fēe, bīt; rōw, wōn, fōr, nōt, dō; cūre, būt, rāde, fūll, bār;n;

- rug-making R-172
women's costume, *picture* R-173
- Kuré** (*kq'ra*), Japan, important naval port on Honshu Island and Inland Sea; pop. 240,000; armament factory: *map* J-186
- Kuria Muria** (*ky'rî-ä my'rê-ä*) Islands, group of five high rocky islands off s. coast of Arabia, belonging to Great Britain; 28 sq. mi.; pop. about 2000; inhabited by Arabs; cable station: *map* A-242
- Kuril** (*kq'rîl*) Islands, or Kurile Islands, also Oshishima, Japan, volcanic group stretching n.e. from Hokushu; 6146 sq. mi.; name comes from Russian *kurit* ("to smoke") in allusion to volcanoes: J-185, *map* J-186 seal herds S-89
- Kuroki** (*ky-rô'kê*), Itai, Count (1844-1923), Japanese general and samurai; distinguished in Chino-Japanese War of 1894-95; in Russo-Japanese War of 1904-05 commanded First Army, defeated Russians at Yalu River, and assisted Oyama at Mukden.
- Kuropatkin** (*kq-rô-pât'kin*), Alexei Nikolaevich (1848-1925), Russian general; in supreme command in East during Russo-Japanese War, until after battle of Mukden, in which he was defeated; again commanded an army 1916 in World War; retired to private life 1917.
- Kuro Shio**, or Japan Current (Japanese "black current"), a warm current flowing n.e. from Japan J-186d, O-200 effect on Alaska A-102
- Kur'umba**, a wild tribe of the Nilgiri Hills in s. India; live in huts of mud and wattle and depend largely upon the jungle for food.
- Kurusu** (*kq'rq'sq*), Saburo (born 1888?), Japanese diplomat W-178v
- Kus'kokwim River**, one of chief rivers of Alaska; 550 mi. to Bering Sea: *map* A-105
- Kustenjo** (*kus-tên'jê*), Rumania. *See in Index* Constantia
- Kutaia** (*kq-tî'yâ*), or Kutahya, Turkey, trade center 75 mi. s.e. of Brusa; pop. 18,000: *map* B-154
- Kut-el-Amara** (*kut ül â-mâ'ra*), Iraq, also Kut-el-Imara, town on Tigris River, 105 mi. s.e. of Baghdad; railroad terminus; coaling point 1st World War W-157
- Kutb Minar**, tower at Delhi, *picture* D-42
- Kutb-ud-Din**, a slave who became sultan of Delhi, founder of Slave Dynasty in India (1206-88); Kutb Minar tower begun during his reign: D-42
- Kutchuk-Rainardji** (*kuch'uk ki-nâr-jê*), Treaty of (1774), between Turkey and Russia, giving Russia strong position on Black Sea.
- Kutonal Indians**, or Kootenay Indians, two tribes of the Kitumahan stock, one living in Montana, the other in British Columbia.
- Kuwait**, Arabia. *See in Index* Koweit
- Kvalø**, Norway, also Whale Island, *picture* N-178
- Kwakwiti** (*kwâ'ki-pîl*), a group of Indian tribes living in the neighborhood of Fort Rupert, British Columbia. With the Nootka they form the Wakashan linguistic family: I-56
- Kwangchow**, city of, China. *See in Index* Canton
- Kwangchowwan**, or Kwangchow, territory leased to France on s. coast of China between Hong Kong and the island of Hainan; about 325 sq. mi.; pop. 250,000: I-73d, *maps* A-332c, C-212
- Kwang'o River**, rises in Angolâ in w. Africa and flows n. into Congo State, forming part of border, *map* C-331
- Kwangsi** (*kwâng'sê*), inland province of s. China; 84,007 sq. mi.; pop. 13,385,000; cap. Nanning (Kweilin); commercial center Wuchow; cassia, grain, metals, gems: *map* C-212
- Kwang-Su**, or Kuang-Hsu, the reign title of Tsai T'ien (1872-1908), emperor of China, during whose reign occurred the war with Japan, the Boxer uprising, and the occupation of Peking by the United Powers: C-221l
- Kwangtung**, province of s.e. China; 83,940 sq. mi.; pop. estimated 32,385,000; cap. Canton; considerable mineral wealth (gold, coal, iron); large exports of silk; chief cities Hong Kong, Macao, Canton: *map* C-212
- Kwantung**, s. portion of Liaotung Peninsula, leased to Japan by China; soy beans, cereals, salt, fish; cap. Dairen; 1428 sq. mi.; pop. 1,950,000: *maps* M-49a, J-186
- Kwan-yin**, Buddhist divinity, goddess of mercy
enamel statue, *picture* E-264
- Kweichow** (*kwâ-chow*), province of s.w. China; 69,297 sq. mi.; pop. 9,043,000; cap. Kweiyang; mineral resources, gold, silver, mercury, tin, coal, and iron: *map* C-212
- Kyanite** (*kî'â-nîl*), or cyanite (*sî'â-nîl*), an aluminum silicate; colorless, or blue, white, gray, green or brown; sometimes cut as gem.
- Kyd** (*kîd*), Thomas (1558?-94), English dramatist, one of most important predecessors of Shakespeare ('The Spanish Tragedy').
- Kyne**, Peter B. (born 1880), American novelist, born San Francisco, Cal.; clerk general store, lumber broker, reporter ('Cappy Ricks', 'The Enchanted Hill', 'They Also Served').
- Kyo'to**, or Kioto, former capital of Japan; pop. 1,090,000: K-41-2, *map* J-186
art museum J-200
Golden Pavilion J-197
- Kyrio Elelson** (*kîr'i-ä ê-lâ'i-sôn*), Greek words, meaning "Lord have mercy," used as form of prayer in both Greek and Roman Catholic churches, and also (translated) in Anglican church.
- Kyushu** (*kû'shû*), also Kiushu, southernmost of four large islands forming Japan proper; over 16,000 sq. mi.; mountainous and volcanic; extensive coal mines; copper, rice, tea, tobacco: *map* J-186, *pictures* J-184, 188a
climate J-186a
harbors J-186



OUR LETTER L probably started in Egyptian writing as a picture of a looped rope (1). To the Egyptians, this picture meant 'loop of rope'; but soon after 2000 B.C., a Semitic people called the Seirites used the picture as an alphabetic sign for the sound of 'l'. They did this because their word *layah* or *loyah* for 'rope' began with this sound.

The Seirites made the sign as a line with a loop (2). The later Canaanite-Phoenician alphabet sharpened the sign into an angle (3), suitable for writing in Semitic fashion from right to left. In Hebrew it was called *lamedh*.

When the Greeks learned to write from the Phoenicians, they turned the letter around for writing from left to right, and renamed it *lambda* (4). Later they gave it a more graceful shape (5); but before this happened the Romans had adopted the earlier shape into the Latin alphabet (6). English writing took the Latin capital L without change.

In late Roman times the small handwritten 'l' was developed from the Greek 'l' by carrying the left-hand stroke up through a loop and then down and to the right (7). Our printed small 'l' is the result of compressing the handwritten loop into a long, upright line.

NOTE.—For the story of how alphabetic writing began and developed, see the articles Alphabet; Writing.

Laaland (16'lan), also Lolland, Danish island in Baltic Sea; 479 sq. mi.; pop. 85,000; map D-53

La'ban, father of Rachel and Leah, and uncle of Jacob; in return for Jacob's long service, Laban gave him both daughters in marriage; after a quarrel Jacob outwitted Laban and came into possession of most of his uncle's flocks (Gen. xxviii-xxxii).

La Barre, Joseph Antoine Lefebvre de (1622-88), governor New France 1682-84; failed to conquer the Iroquois and was recalled.

La Befana, Italian Santa Claus C-229c Labiatae (la-bi-a'te), plant family including mint, catnip, and ground ivy M-196

Labiche (la-besh'), Eugène M. (1815-88), French dramatist ('Le Voyage de M. Perrichon').

'La Bohème' (la-bô-ém'), opera by Puccini, story O-229

Labor L-43-5. See also in Index Child labor; Home economics; Industrial education; Industrial Revolution; Machinery; Minimum wage; Socialism; Safety devices; Strikes; Unemployment

American colonies A-151, 157; cities and towns A-166; plantations A-163-4

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collective bargaining L-44c, R-146; early need for L-43-4; Wagner-Connelly Labor Relations Act L-44d

conciliation L-44c, d, A-247 division of labor E-151, M-11

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international trade based on L-110-110a

modern assembly line A-391, F-153, I-74j, l, pictures A-390, M-11

money aids M-220 pioneer life P-221d

economic factor in production

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employers' weapons against L-44c England, conditions E-275, 276, 276a; Middle Ages E-153; 17th century A-151; 18th and 19th centuries L-43-4, I-74g-h, E-276a

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forced labor: Central America C-133a; Egypt E-200 Germany G-76a

hours of L-44d, L-93a. See also in Index Hours of labor; Wages and hours law

immigration problems I-23, 24, H-253 Industrial Revolution and machine

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leisure time aspect L-93a-b, c, pictograph I-74o

shift of employment versus unemployment M-10, I-74n, A-391

skilled craftsmen replaced M-11 technological unemployment A-386, I-74n, M-10

Latin America L-67n-o, m. See also in Index Peonage

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Mexico M-142-142a, M-140 mediation L-44c, A-247

Negro N-62 Panama Canal: "silver" and "gold" employees P-45

peonage S-161-2. See also Peonage putting-out system, domestic, or cottage, industry I-74a-b, E-275

Russia R-190-4, 194a serfdom S-160-1: ancient Sparta S-239; England T-171-2; Middle Ages F-27, 29; Poland P-276; Russia R-184, 185, T-156

slavery S-158-62 socialism and S-180-1

sweatshop system S-334, C-277-8 tariff protects T-13a

unemployment insurance I-95, S-179, L-44d

United States U-230; average number employed in leading manufactures, chart U-193; changes in occupations, pictograph U-188d; Employment Service U-231; F. D. Roosevelt's administrations

R-146f-m, o, N-12j-k, 12r-13 wages E-150. See also in Index

Wages working conditions and efficiency W-147-8; climate affects C-271

workmen's compensation E-263, S-179; insurance I-94-5

Labor, American Federation of L-44a-b, 45

Gompers' work G-119 Labor, Department of, U. S. U-230, L-44d, chart U-229

child labor laws C-205 Conciliation Service A-247, U-230

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Labor, Knights of (U.S.) L-44-44a, L-45, P-293

Labor and capital I-74g-h. See also in Index Arbitration, industrial; Capital; Labor; Strikes

Labor and Socialist International. See in Index Second International

Labor banks B-45 Labor Day, a holiday L-45, H-322

Labor legislation L-44c-45. See also Factories and factory laws

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workmen's compensation I-94 Labor-Management Committees, in 2d World War N-12k

Labor movement L-43-5, U-246. See also in Index Hours of labor; Labor legislation; Wages

American Federation of Labor (A. F. of L.) H-253, G-119, L-44a-b, 45

boycott B-212 Congress of Industrial Organization (C. I. O.) L-44a-b, L-45

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Key—câpe, ât, fâr, fâst, whqt, fâll; mē, yēt, fērn, thêre; îce, bît; rôw, wôn, fôr, nôt, dq; cûro, bût, ryde, fûll, bûrn;

F-2, E-276a, L-44, 44d, 45; Germany G-69, 73, L-45; Italy's labor syndicates F-18, I-100
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 Industrial Workers of the World (I. W. W.) L-44a, C-325
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 unemployment insurance I-05
 unions, labor or trade L-44-5: Gompers' work G-119; legalized in England L-44; status in U. S. in 2d World War N-12j-k
 Labor parties L-45, I-74h
 Labor party, Australia A-375, L-45
 Labor party, British, formed 1906 to represent organized labor and Socialists; at first cooperated with Liberals, later adopted socialistic program of reform: E-278-278a, P-291
 development L-45
 MacDonald first Labor prime minister M-4
 Labor Relations Board, National R-146g, L-44d
 Labor's Non-Partisan League L-45
 Labors of Hercules H-282
 Labor Standards, Division of, in U.S. Department of Labor U-230
 Labor Statistics, Bureau of U-230
 safety promoted by S-2c
 Labor syndicates
 under fascism F-18, I-160
 under syndicalism C-325
 Labor unions L-44-5. *See also in Index*
 Labor movement
 Labouchère (lā-bō-shēr'), Henry Du-Pré (1881-1912), English journalist and radical politician, editor of the weekly *Truth*, noted for exposure of public frauds.
 Lab'rador, most easterly part of the North American mainland; British colony administered as a dependency of Newfoundland; 120,000 sq. mi.; pop. 4000; L-46, maps C-50c, 58
 boundary fixed in 1927 Q-5
 Eskimos E-300
 Laurentian Plateau underlies L-72
 work of Dr. Grenfell G-177-8
 Labrador Current
 causes fogs F-132
 effect on Labrador L-46
 Labrador duck, an extinct black-and-white sea duck closely allied to eider duck; found on north Atlantic coast of North America as far south as Long Island; believed to have bred in Labrador.
 Labrador ice sheet I-2b, map I-3
 Labradorite, a gem G-28
 Labrador tea, evergreen shrub (*Ledum groenlandicum*) of heath family; found in swamps of Greenland, Labrador, Canada; used for tea.
 La Brea pits, Los Angeles L-199, picture C-33
 La Bretonne, Restif de. *See in Index*
 Restif de la Bretonne
 La Bruyère (lā brū-yēr'), Jean de (1645-96), French essayist and wit; one of best writers of classical French ('*Caractères*', '*Mémoires*').
 Labuan (lā-bō-an'), British island of Malay Archipelago, in Brunel Bay, off n. Borneo; included in Straits Settlements; 35 sq. mi.; pop. 8000; cap. Victoria; M-43, map A-332c

Laburnum, a small tree of the pea family native to s. Europe; cultivated for showy yellow flowers and glossy foliage; all parts poisonous; in U.S. called bean tree or golden-chain.
 Lab'yrint, name given by Greeks and Romans to buildings, entirely or partly underground, with intricate winding passages in which one easily became lost. *See also in Index*
 Maze
 Crete C-394
 Greek mythology D-1, T-79
 Labyrinth, in anatomy, the inner ear E-128, 127, 128
 Lac (lāk), resinous substance, consisting of shellac and crimson coloring matter, secreted by scale insects L-52
 Japanese use J-202
 Laccadive (lāk'd-dīv) Islands, group of 14 coral islands 200 mi. w. of s. India in Indian Ocean; pop. 16,000; belong to Madras Province, British India: map A-332c
 Laccolith (lāk'ō-lith), in Devils Tower, Wyoming N-22
 Lace L-47-51
 gold G-114
 hand made L-47, pictures L-48, 49
 history of lace making L-47-8
 linen thread for L-148
 machinery L-47, pictures L-50, 51
 Jacquard loom L-47, S-259, pictures L-50, 51
 varieties L-48
 where made L-47, 48: Belgium B-38; France F-176; Pennsylvania, picture P-113
 Lace-bark tree, tree of the West Indies (*Lagetta linearis*) remarkable for its inner bark of interlacing fibres resembling coarse lace; used for collars, frills; also for making whips and rope.
 Lacedaemon (lās-ē-dē-mōn), the ancient name of Laconia, in Greece, country of which Sparta was capital S-239
 Laco-making machinery L-47, pictures L-50-1
 Lacerilla (lās-ē-yīl'ī-d), suborder of reptiles comprising the lizards L-172
 Lace verbena. *See in Index*
 Zaluzian-sitya
 Laccwing fly I-91-2, 93
 eggs, picture E-193
 Lachaise (lā-shēr'), Gaston (1886-1985), sculptor, born Paris; in United States after 1908; best known for monumental female figures modeled in large, simple planes.
 Lachesis (lāk'ē-sis), one of the Fates F-18
 Lachine (lā-shēn'), Quebec, manufacturing town and summer resort on Lake St. Louis connected with Montreal 8 mi. n.e. by Lachine Canal; pop. 18,630; large water commerce; steel plant. Burned and inhabitants massacred by Indians 1689; map, inset C-50c
 Lachine Rapids, in St. Lawrence River S-8
 shooting the rapids, picture C-52
 Laolish (lā'kīsh), ancient city in s. Palestine, often mentioned in Tel-el-Amarna tablets and in Bible; destroyed by Joshua (Joshua x, 31-3) and assigned to tribe of Judah (Joshua xv, 39).
 Lachlan River, in New South Wales, Australia; joins Murrumbidgee River near junction with Murray River; 700 mi. long.
 Lachrymal. *See in Index*
 Lacrymator, also lacrimator, a tear gas G-24-5
 Lac-insect L-52

Lackawan'na, N. Y., industrial and railroad city on Lackawanna River 6 mi. from Buffalo; pop. 24,058; large steel plant: map N-114
 Lackawanna River, in n.e. Pennsylvania; flows 60 mi. s.w. to Susquehanna River.
 Lackland, nickname for King John of England J-222
 Laclede (lā-klēd'), Florrie (1724-78), also called Pierre Laclede Liguest, American fur trader and founder of St. Louis, Mo.; born in Lower Pyrenees, France; emigrated to New Orleans 1755 and established a fur trade with the Indians of the Missouri River area; 1764 founded trading post on present site of St. Louis.
 Laclede's Village, old French town on site of St. Louis, Mo. S-10
 Lacombe, Albert (1827-1916), Canadian Roman Catholic missionary, born St. Sulpice, Lower Canada; one of first missionaries sent to Northwest Territories; author of grammar and dictionary of Cree Indian language.
 Laconia (lā-kō'nī-d), in ancient Greece, s.e. district of Peloponnese of which Sparta was the capital S-239, map G-154
 origin of 'laconic' S-239
 Sparta conquers G-156
 Laconia, N. H., summer resort and industrial city on Winnepesaukee River 28 mi. n. of Concord in beautiful lake region; pop. 13,484, knitting machines, hosiery, needles, brass and iron castings: map N-86
 Lacquer (lāk'er) L-51-2, P-32b
 cellulose or pyroxylin type L-51, C-123, P-373
 furniture decoration I-100, 102
 solvents L-52, C-180
 Lacquer-enamels L-52
 Lacquer-ware also known as japaning L-51-2, J-202, C-221i
 Lacrimal (lāk'ri-māl) bone, a small bone within the orbit of the eye S-156
 Lacrimal, or lachrymal, glands, the tear-secreting organs at upper and outer part of eye cavity E-352
 La Crosse (lā-krōs'), Wis., manufacturing and trade center on Mississippi River 120 mi. s.e. of St. Paul, Minn.; pop. 42,707; center of stock-raising and dairying region and tobacco market; rubber boots and shoes, machine shop products, air-conditioning and heating equipment, agricultural machinery; state teachers college: map W-124
 Lacroise, a game L-52-3
 early form of, picture I-62
 origin I-54
 Lao (lāk) sulphur's, milk of sulphur S-324
 Lactarius pergamenus, a mushroom, color plate M-308a-b
 Lac'teal, any one of the lymphatic vessels of the intestinal canal B-157b, P-206-7
 Lac'tic acid, the acid formed in sour milk; chemical composition C₂H₄O₃; butter-making uses D-4
 buttermilk contains M-173
 cheese-making C-164, picture C-185
 fermentation causes F-24
 muscle action develops B-110, R-80
 yeast culture Y-204-5
 Lac'tose, or milk sugar, a double (disaccharide) sugar (C₁₂H₂₂O₁₁), reducible to galactose and glucose; differs from maltose and sucrose in structure of molecule; about one-sixth as sweet as cane sugar: M-173, S-322
 Lacustrine plain, the bed of a dried-up lake P-200

Lad'anum, or **labdanum**, a resin obtained from the plants *Cistus ladaniferus* and *Cistus villosus*; important in manufacture of heavy perfumes.

Ladd, Edwin Fremont (1859-1925), American political leader and chemist; born Starks, Me.: N-164

Ladd, George Trumbull (1842-1921), American philosopher, born Painesville, Ohio; one of first to introduce study of experimental psychology into America; founded Yale psychological laboratory (translation, Lötze's 'Outlines of Philosophy', 6 vols.).

Ladder
safety measures in using, *picture* S-2e, j

Ladder dredge D-105

Ladd-Franklin, Christine (1847-1930), American scientist, born Windsor, Conn.; first woman to be received as a student at Johns Hopkins, and at universities of Göttingen and Berlin; distinguished career in mathematics, physics, and psychology; famous for her theory of color perception.

Ladlos' oardrops, a fuchsia F-215

Ladies' sorrel, or wood sorrel, a low herb of the genus *Oxalis*
acid leaves N-39
explosive seed-pods W-64, S-73

Ladlos tresses, a wild flower of the genus *Spiranthes* of the orchid family; flowers small, white, yellowish or greenish-white, in twisted spikes.

Lading, bill of. *See in Index* Bill of lading

Ladino (*lū-dē'nō*), term used for persons of mixed Spanish and Indian blood C-133. *See also in Index* Mestizo

Ladislav (*lād'is-lous*), common form of **László** (*lā'slō*) I, Saint (1040-95), king of Hungary and founder of national greatness; established Christianity and subdued heathen hordes; most beloved of Hungarian kings; canonized 1198; festival June 27.

Ladislav, Will, a character in George Eliot's 'Middlemarch' E-254

Ladoga (*lādō-gā*), Lake, largest lake of Europe, in n.w. Russia; 7000 sq. mi.: L-53, map E-326e

Ladrone (*lā-drōn'*) Islands. *See in Index* Marianas Islands

Lady, title D-35

Lady-bug, or lady-bird, a small spotted beetle L-53
preys upon: aphids A-226, *picture* I-90; mealy bugs I-90; potato-bugs P-328; scale insects S-34-5, I-90

Lady Godiva (*gō-dī'vā*) (11th century), legendary English heroine C-386

Lady Jane Grey (1537-1554), 'nine-days' queen' of England G-178

"Lady of Christ's", nickname of Milton M-177

Lady of the Lake, water fairy and enchantress of Arthurian legend; treacherously imprisoned Merlin in an enchanted tower in the forest of Brécéliande; reared Lancelot in her palace, situated in the middle of an imaginary lake
King Arthur's sword A-315

'Lady of the Lake, The', poem by Scott S-49

Lady'slipper, a plant of the orchid type L-53, *picture* N-29a
poisonous properties P-272
structure of ovary, *picture* F-127

Ladysmith, Union of South Africa, trade center, and railroad junction

in n. Natal; pop. 10,000; besieged by Boers for 118 days (1899-1900) during South African War: map A-42a

Roberts raises siege R-117

Lae, cap. of Mandated Territory of New Guinea N-85

Léannee (*lā-ā'nēk*), René Théophile Hyacinthe (1781-1826), French physician, born Brittany; invented the stethoscope and began practice of auscultation in medicine.

Laertes (*lā-ēr'tēz*), father of Odysseus O-206

Laertes, in Shakespeare's 'Hamlet' H-206

Laevo-rotation, or **lovo-rotation**, of polarized light; rotation to the left: T-14, L-131

La Farge (*lā fārg'*), John (1835-1910), American painter, mural decorator, and designer of first stained glass made in U.S.; born New York; exercised great influence on American art (lunettes, Supreme Court room, Minnesota State Capitol; 'Battle Window', Memorial Hall, Harvard): P-27, B-201

La Farge, Oliver (born 1901), American writer, born New York City, grandson of John La Farge; graduated at Harvard; made archeological and ethnological expeditions to Arizona for Harvard and to Guatemala and Mexico for Tulane University; writes with intimate knowledge and understanding of the Indians ('Tribe and Temples'; 'North Is Black', short story; 'Laughing Boy', novel, won Pulitzer prize 1930).

Lafayette (*lā-fā-yēt'*), George Washington Motier de (1790-1849), son of Marquis de Lafayette; aide-de-camp to General Grouchy; guest of Washington W-20

Lafayette, Gilbert Motier, Marquis de (1757-1834), French general and patriot L-54-5

Bartholdi's sculptures B-52
lays cornerstone of Bunker Hill monument B-272
part in American Revolution L-54
Perehing visits tomb W-171
son named for Washington W-20

Lafayette, Marie-Madeleine, Comtesse de (1634-92), French novelist; her masterpiece, 'La Princesse de Cleve', is the first modern novel of sentiment in which the story's interest depends not on the incident but on the character of the persons involved.

Lafayette, Ind., city in agricultural region 60 mi. n.w. of Indianapolis; pop. 28,798; railroad shops; makes iron and aluminum products, box board, and paper products: map I-46

Purdue University I-50

Lafayette, La., city 115 mi. n.w. of New Orleans; pop. 10,210; lumber, cotton, sugar; Southwestern Louisiana Institute: map L-206

Lafayette, fish. *See in Index* Spot

Lafayette, we are here' W-171

Lafayette College, Presbyterian institution for men at Easton, Pa.; opened 1882 (chartered 1826); classical, scientific, and engineering courses.

Lafayette National Park, former name of Acadia National Park N-20

Lafayette Square, Washington, D.C., public park north of the White House; contains statues of generals Lafayette, Pulaski, and Steuben: W-25

statue of Lafayette, *picture* L-54

La Fère (*lā fēr*), France, town on Oise River 15 mi. n.w. of Laon; pop. 3000; scene of fighting in World War 1914-18 and again in 1940; map W-151

Lafitte (*lā-fēr*), Jean (1780-1826?), American pirate, slave-trader, and smuggler, born France; hero of many stories; operated from island in Barataria Bay; scorned British bribe, aided Americans in Battle of New Orleans, pardoned 1815 by President Madison.

La Follette (*lā fōl'ēt*), Philip F. (born 1897), American lawyer and politician, born Madison, Wis.; son of Robert Marion La Follette; progressive Republican; governor of Wisconsin 1931-33, 1935-39.

La Follette, Robert Marion (1855-1925), American political leader, born Primrose, Wis.; known as 'Fighting Bob'; governor of Wisconsin 1900-05; U.S. senator 1905-25; a progressive Republican who always subordinated party ties to his own principles; strongly opposed U.S. entrance into World War; many of the reforms he sought incorporated in the 'Wisconsin idea'; independent presidential candidate in 1924
heads Progressives P-293
opposes Taft T-3
Seamen's Act S-129

La Follette, Robert Marion, Jr. (born 1895), American politician, born Madison, Wis.; son of Robert Marion La Follette; progressive Republican; became U. S. senator from Wisconsin 1925.

La Fontaine (*lā fōn-tēn'*), Jean de (1621-95), French poet and fabulist ('Fables', old tales retold with sparkling freshness; memorized by every French school child)
'Panchatantra' source of tales S-301

La Fontaine, Sir Louis Hippolyte (1807-64), Canadian jurist and statesman, premier 1842-44 and 1848-51; chief justice of Lower Canada 1853-64
association with Baldwin B-16

Lagado, in 'Gulliver's Travels', the capital of Balnibarbi; here a celebrated Academy of Projectors engages in extracting sunbeams from cucumbers, in converting ice into gunpowder, and in similar ridiculous ventures.

Lagash, ancient city-kingdom in Babylonia, one of oldest centers of Sumerian civilization
eagle as symbol E-123

Lagerlöf, Selma Ottilliana Lovisa (1858-1940), Swedish writer: L-55, S-303f

Lagoon, a pool or lake, especially one connected with the sea
coral islands P-5
harbors formed by H-216

Lagos (*lā-gōs*), a region (formerly province) of s. Nigeria; in w. Africa; 27,000 sq. mi.; low marshy coast, with countless lagoons; forested interior yields palm oil and kernels, mahogany, rubber; chief cities Ibadan (including surrounding district, 387,000); Lagos (100,000); Abeokuta (60,000): map A-42a

Lagrange (*lā-grānzh'*), Joseph Louis (1736-1813), French mathematician, one of greatest of 18th century; contributed to verification of Newtonian theory of gravitation.

La Grange (*lā grāng'*), Ga., industrial city and trade center, 68 mi. e.w. of Atlanta; pop. 21,983; textile manufacturing; La Grange College: map G-56

La Grange, Ill., city 13 mi. s.w. of Chicago; pop. 10,479; settled in 1830's; named for Lafayette's home in France; Masonic Orphans Home.

La Granja (*lâ grân'hâ*), Spain. *See in Index* San Ildefonso

La Guaira (*lâ guî'râ*), Venezuela, leading seaport of country, on n. coast; has artificial inner harbor; pop. 10,000; V-275, map V-276

La Guardia (*lâ gûd'r'âyâ*), Fiorello H. (born 1882), mayor of New York City, elected 1933, 1937, and 1941; director of Office of Civilian Defense May 1941 to February 1942.

Laguna (*lâ-gg'nâ*) (Spanish "lagoon"), a pueblo of the Keres Indians west of the Rio Grande, New Mexico; established 1699.

Laguna de Madre (*lâ mäd'râ*), lagoon, on Texas coast T-56

La Halle, Adam de. *See in Index* Adam de la Halle

La Harpe (*lâ arp*), Bernard, Sieur de, French explorer in America A-298

La Hogue (*lâ ôg*), or La Hougue, battle of, fought 1692 near n.e. extremity of peninsula of Cotentin, Normandy, France; English and Dutch fleets under Admiral Russell defeated French fleet under Tourville; J-183

Lahontan (*lâ-hôn'tân*), Lake, Nevada N-78

Lahontan Dam, Nevada, *picture* I-149

Lahore (*lâ-hô'*), British India, ancient walled city on river Ravi; largest city and cap. of Punjab; pop. 430,000; railroad center; makes silk and cotton cloths, carpets, vegetable oils; Punjab University; maps I-30, A-332b

Lai (*lâ*), a medieval short tale Franklin's, in 'Canterbury Tales' C-182

Lalbach (*W'bâr*), Yugoslavia. *See in Index* Ljubljana

Laid paper P-58

L'Aiglen (*lâ-glô'h'*), poetic name meaning "eaglet" given by Victor Hugo to Duke of Reichstadt, son of Napoleon and Marie Louise; subject of play by Rostand

Sarah Bernhardt plays, *picture* D-97

Laird, David (1833-1914), Canadian journalist and statesman, born New Glasgow, P.E.I.; 1873 elected to Canadian House of Commons; 1878-76 minister of the interior; 1876 lieutenant governor of Northwest Territories.

Laissez-faire (*lâ-sâ-fê'r*) ("let it be"), the 18th-century (French) way of saying "less government in business"; in contemporary use means unrestricted industrial and commercial competition: I-74b, g

Lality, defined C-232

Laïus, in Greek mythology, father of Oedipus O-208

La Jonquière, Jacques Pierre Taffanel, Marquis de (1680-1753), French naval officer, born near Albi in s. France; fought numerous engagements against British; governor of New France 1749-58.

'La Juive' (*lâ shü-ôv'*) ('The Jewess'), opera by Halévy, story O-230

La Junta, Colo., railroad center, 90 mi. s.e. of Colorado Springs; pop. 7040; junction of main line and Denver branch of Santa Fe R. R.; large railroad shops: map U-188b

Lake, Simon (born 1866), American naval architect, born Pleasantville, N.J.; inventor of even-keel type of submarine.

Lake. *See in Index* Lakes; also names of individual lakes, as Erie, Lake

Lake Charles, La., commercial and manufacturing city on Lake Charles, 185 mi. w. of New Orleans; channel to Gulf; pop. 21,207; oil fields near by: map L-206

Lake Country, or Lake District, in n.w. England, containing all principal English lakes B-280, *picture* E-278

Lake Dwellers, Stone Age people who built huts on pile foundations along the shores of lakes M-48, S-111, D-113b, *pictures* M-47, S-111, C-245, *color plate* M-48c-d

bread B-228

Lake Erie, battle of, in War of 1812 P-128, W-10, *picture* W-9

Lake Erie College, at Painesville, Ohio; women; founded 1859 (continuing Willoughby Seminary, founded 1847), present title 1908; liberal arts.

Lake Forest College, at Lake Forest, Ill.; Presbyterian; founded 1876 liberal arts and business.

Lake Geneva, Wis., city in s. Wisconsin about 65 mi. n.w. of Chicago; popular summer resort; on Lake Geneva; pop. 3238; Yerkes observatory of University of Chicago, 6 mi. w. of city.

WORLD'S GREATEST LAKES

NAME	AREA IN SQ. MI.
Caspian Sea.....	170,000
Superior.....	31,820
Victoria.....	26,000
Aral.....	24,000
Huron.....	23,010
Michigan.....	22,400
Nyasa.....	14,000
Baikal.....	13,200
Tanganyika.....	12,700
Great Bear.....	11,500
Great Slave.....	11,200
Chad.....	10,000
Erie.....	9,940

Lake herring, or cisco W-85

Lakehurst, N.J., village about 55 mi. s. of New York City; pop. 827; naval station for lighter-than-air training and experimental projects; parachute school.

Lakeland, Fla., city 82 mi. e. of Tampa; pop. 22,069; 15 lakes; phosphate, citrus fruit, strawberries, vegetables; Florida Southern College: map E-112

Lake of the Woods, an island-dotted body of water of n. Minnesota and adjacent parts of Ontario, Canada; 1485 sq. mi.; 105 mi. long: map M-192

muskellunge fishing P-218

Lake Placid, village in N.Y.; pop. 3136; a famous winter and summer resort in Adirondack Mts.; near by is the grave of John Brown, the abolitionist.

Lake Poets, a group of poets—Coleridge, Wordsworth, and Southey—who lived in the Lake Country of northern England C-299, E-280

Lake Regillus, battle of (496 B.C.) R-130

festival on anniversary, *picture* R-141

Lakes L-55. *See also in Index* Lake dwellers. For list of greatest lakes see *table* on this page

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drained, effect on drought and floods F-106d

earthquake origin E-136

extinct: Agassiz P-200, M-54; Bonneville G-150a; borax deposits B-192; lacustrine plain P-200; potassium salt deposits P-323-4

fresh-water: deepest in world B-15; **deepest in North America**, *picture* N-17; **largest** S-331, L-55

glacial origin I-2a, L-55

largest inland body of water L-55

longest in world A-38

North America N-151

pollution of C-342-3

salt L-55; **Caspian Sea largest** C-91; **Dead Sea** P-34; **Great Salt Lake** G-150a; **Owens Lake** D-118a; **potassium salts left by evaporated lakes** P-323-4

shore line changes aid drought studies D-113a

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Illinois Waterway links I-15-10, C-189, map G-146a

Lake trout T-145

Lake Washington Bridge, in Washington, *table* B-342

Lakewood, Ohio, suburb of Cleveland 4 mi. w., chiefly residential; pop. 69,160.

Lake Worth Park, near Fort Worth, Tex. F-161

Lakh (*lâk*), in Indian currency I-38

Laki, Mount, volcano in Iceland I-5

Lalande, Saint John (died 1646), Roman Catholic martyr; native of Dieppe, Normandy; companion of Father Jogues; murdered by Mohawks at Ossernenon, N.Y.; canonized 1930.

Lalande (*lâ-lând'*), Joseph Jérôme L. de (1732-1807), French astronomer; professor Collège de France, director Paris observatory; popularized astronomy; established annual Prix Lalande for most useful work on astronomy.

Lalemant, Gabriel (1610-49), Canadian Jesuit missionary, born Paris, France; came to Canada 1646; worked with Father Brebucuf among the Huron Indians and was killed by them.

Lallique (*lâ-lêk'*), René (born 1860), French jeweler, famous for carving in jewels and glass.

'Lalla Reekh' (*lâ-lâ rêk*), Oriental poem by Thomas Moore, first published in 1817

scene of, *picture* R-110

'L'Allegro' (*lâ-lâ grô*) ("the happy man"), poem by Milton; companion poem of 'Ti Penseroso'; describes quiet pleasures of a contented man quoted H-286

Lallemantia, a biennial plant (*Lallemantia canescens*) of the mint family, native to w. Asia. Grows to 18 in. with soft, somewhat hairy leaves; flowers whorled, blue, in 10 in. spikes, have aromatic odor.

Lalo (*lâ-lô'*), Edouard (1823-92), French musical composer ('Le Roi d'Ys', opera; 'Symphonie Espagnole', 'Norwegian Rhapsody', orchestral works).

La'maleim, a religion of Tibet and Mongolia T-90, M-222d

La Malbala, Canada. *See in Index* Murray Bay

Lamar, Lucius Quintus Cincinnatus (1825-93), American jurist and statesman, born Putnam County, Ga.; drafted Mississippi ordinance of secession; U.S. senator 1877-85; secretary of interior 1885-88; justice U.S. Supreme Court 1888-93; helped reconciliation between North and South after Civil War.

- Lamar, Mirabeau B.** (1798-1859), American soldier, born Louisville, Ga.; participated in Texas revolution and distinguished self at San Jacinto; president Texas Republic 1838-41; major general Mexican War; U.S. minister to Argentine Republic, Nicaragua, Costa Rica.
- Lamarck** (*lâ-mâr'k*'), Jean de (1744-1829) French naturalist, who adopted (in 1802) the word "biologie" as name of new science to be devoted to study of all life considered as the same process whether in plants or animals
forerunner of Darwin E-340, Z-227
modern "Lamarckians" E-342
- Lamartine** (*lâ-mâr-tên'*), Alphonse de (1790-1869), French poet, historian and statesman ('Meditations'; 'History of the Girondins').
- Lamb, Charles** (1775-1834), English essayist L-55-6
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essays L-56, E-304
letters L-98a
opinion of Coleridge C-300
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'Tales from Shakespeare' S-100g, L-161
- Lamb, Mary** (1764-1847), English writer, sister of Charles Lamb L-56
'Tales from Shakespeare' S-100g, L-161
- Lamb, William.** See in Index Melbourne, William Lamb, Viscount
- Lamb, a young sheep** S-104
skin used for gloves G-107
wool W-145
- Lamballe** (*lâh-bâl'*), Marie Thérèse de (1740-92), French princess, friend of Marie Antoinette; killed by revolutionary mob and her head carried past the queen's prison windows.
- Lambert, Louis.** See in Index Gilmore, Patrick S.
- Lambeth**, metropolitan borough of S. London; pop. 298,000; Lambeth Palace, London residence of archbishop of Canterbury.
- Lambkill**, or sheep-laurel, an evergreen shrub (*Kalmia augustifolia*) of the heath family, native to N. America. Grows to 3 ft.; flowers purple or crimson, small, in flat-topped clusters.
- Lamb's ears**, a perennial plant (*Stachys lanata*) of the mint family, native to W. Asia. Grows to 18 in., entire plant white, woolly, with oblong leaves and spikes of tiny, tubular, purple flowers; sometimes called woolly woundwort.
- Lamb's lettuce.** See in Index Cornsalad
- Lamb's quarters**, or goosefoot, an annual herb (*Chenopodium album*) of the goosefoot family with clusters of small greenish flowers and leaves shaped like the foot of a goose; although considered a pest, delicious greens may be made from it.
- Lamb's wool** W-145
- Lamb vulture** V-336
- "Lame Duck,"** or 20th, Amendment H-335, C-332
text U-218
- Lamentations**, book of Old Testament traditionally ascribed to Jeremiah; comprises five dirges bewailing the destruction of Jerusalem.
- Lamenting bird.** See in Index Limpkin
- Lamia** (*lâ-mî-â*), in Greek mythology, a beautiful vampire; in Keats' poem 'Lamia', a serpent who assumes a beautiful human form to win a man's love.
- Laminated**, arranged or made in thin layers (laminae)
- glass G-104
plastics P-245k
- Lammergerler** (*lâm'êr-ji-êr*), or bearded vulture V-336
- Lamelle River**, in N. Vermont; cuts Green Mts.; flows into Lake Champlain; map N-86
- Lamon** (*lâ-môn'*), Ward Hill (1828-93), law partner, secretary and biographer of Abraham Lincoln, picture C-251
- Lamont, Daniel Scott** (1851-1905), American politician; born Cortlandville, N. Y.; private secretary to President Cleveland; secretary of war in Cleveland's cabinet 1892-6; vice president, Northern Pacific Railroad.
- Lament', Robert Patterson** (born 1867), U.S. secretary of commerce under President Hoover; born Detroit, Mich.; engineer and manufacturer; president American Steel Foundries 1912-29.
- La Motte-Fouqué** (*fô-kô'*), Friedrich, Baron de (1777-1843), German romantic poet and novelist, born Brandenburg; extremely popular in early 19th century ('Undine').
- Lampblack**, or carbon black, a form of carbon G-24, picture C-170
ink I-79, C-303
pencils P-108
phonograph records P-176
tire manufacture G-24, R-166
- Lampman, Archibald** (1861-99), Canadian poet C-65-8
- Lamprey**, an eel-shaped cartilaginous fish with sucker mouth L-56, pictures F-68, P-86
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pewter: American origin A-174, pictures L-58, A-173
primitive L-56, pictures L-57
signaling S-143, L-57
sodium vapor lamps S-190
- Lamp'sacus**, ancient Greek city of Mysia, Asia Minor, on Hellespont, opposite Gallipoli.
- Lamp shell**, or brachiopod, wormlike animal resembling a mollusk S-107, W-180b, picture S-109
Cambrian times G-40
- Län** (*lân*), Swedish district S-338
- Lana**, Francis, balloon, picture E-22
- Lanal** (*lâ-nû'ê*), one of the Hawaiian Islands; 139 sq. mi.; pop. 3720; highest point 3400 ft.; pineapple plantations; maps H-242, 243
- La Navidad**, in Haiti. Columbus' first settlement in New World: H-198
- Lancashire** (*lân'kâ-shêr*), or Lancaster, county of N.W. England; 1641 sq. mi.; pop. 1,795,000; iron and coal mines; manufacturers of textiles, machinery: L-59
textile industry E-278, M-49
- Lancaster** (*lân'kâs-têr*), John of Gaunt, Duke of. See in Index John of Gaunt
- Lancaster, Joseph** (1778-1838), English educator
Lancastrian system E-177
- Lancashire**, England, capital of Lancashire, on Lune River, 7 mi. from sea; pop. 45,000; was ancient Roman station: L-59, map E-270a
- Lancaster, Ohio**, farming center and manufacturing city on Hooking River, 28 mi. S. of Columbus; pop. 21,940; glassware, shoes, foundry products: map O-210
- Lancaster, Pa.**, manufacturing and railroad center 34 mi. S.E. of Harrisburg in agricultural district; pop. 61,345; state cap. 1799-1812; tobacco market and stockyards business; linoleum and cork goods, watches, textiles, iron and steel products; Franklin and Marshall College: map P-112
former state capital P-117
- Lancaster, House of**, famous English royal family L-59, table R-158. See also in Index Roses, Wars of the founded by Henry IV H-273
list of rulers E-270
- Lancaster Turpin** R-118
- Lancastrian**, monitor system of education E-177
- Lance**, long-shafted cavalry weapon with spear head, of more importance in medieval than in modern times.
- Lance corporal**, soldiers appointed to act as corporal but not given a warrant for the grade.
- Lancelot.** See in Index Amphioxus
- Lancelot** (*lân'sê-lôt*) of the Lake, or Lancelot, in Arthurian legend, the bravest and most famous of the Knights of the Round Table; outstanding figure in Tennyson's 'Idylls of the King': picture L-119
quest for Grail G-1, picture A-315
- Lancewood**, name given to several trees of family *Anonacae* native to West Indies and Guiana, and to their highly pliable and tough even-grained wood, which is used for fishing rods and other articles requiring a combination of flexibility and strength.
- Lanciani** (*lân-chî-nî*), Rodolfo (1846-1929), Italian archaeologist; professor ancient topography University of Rome; made important discoveries at Ostia, Tivoli, Rome ('Ancient and Modern Rome').
- Lancret** (*lân-krê'*), Nicolas (1690-1743), French painter, born Paris; greatly influenced by Watteau; gay portrayals of French society.
- Land**, Emory S. (born 1879), naval officer, born Canon City, Colo.; made commissioner U. S. Maritime Commission 1937, chairman 1938; appointed chief of War Shipping Administration 1942.
- Land.** See also in Index Agriculture; Eminent domain; Irrigation and reclamation; Land grants; Lands, public; Land tenure; Land use area of U. S. compared to world, photograph U-188a
description of townships, sections, and quarters, diagram L-60
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Landau, automobile A-393
 Landauler, automobile A-393
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 Land crab C-390
 Landes (*lānd*), region of s.w. France, vast tract of sandy marshland bordered by dunes
 reclamation S-22
 "Land flowing with milk and honey" P-35
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 railroads N-165
 Landi Khana, British fort on Afghanistan frontier, *picture* A-29
 Landing strip, for airplanes A-74d
 Landis, James McCauley (born 1899), educator and public official, born Tokyo, Japan, where his parents were missionaries; taught law at Harvard Univ. 1926-34, dean of law school after 1937; member SEC 1934-37; director Office of Civilian Defense 1942-43; made director of American economic operations in Middle East Sept. 1943.
 Land's, Keneasaw Mountain (born 1866), American judge, born Millville, Ohio; U. S. district judge northern district of Ill. 1905-22; tried Standard Oil rebate cases 1907 and sentenced defendants to pay \$29,240,000; appointed national baseball arbiter 1920.
 Land League, Irish B-212, P-81
 Landlord, owner or master of land or of building rented to tenants
 cotton farms C-378
 feudal system F-27, 28, 29
 Land measure, units of, *table* W-67
 Land Office, General, U.S. *See in Index* General Land Office, U.S.
 Land of Nod, term used to designate the state of sleep; so called from the unknown land of "wandering," or Nod, to which Cain fled after the murder of Abel (Genesis iv).
 Land of the Maple Leaf, Canada C-49
 Land of the Midnight Sun, Norway N-171
 Land of the Rising Sun, Japan J-184
 Landon, Alfred Mossman (born 1887), American political leader, born West Middlesex, Pa.; governor of Kansas 1933-37; Republican candidate for presidency 1936: R-146k
 Lan'dor, Walter Savage (1775-1864), English author; a poet of distinction, also master of English prose style ('Pericles and Aspasia'; 'Imaginary Conversations').
 Land Ordinance, U.S. (1785) E-177
 Landowska (*lān-dōf'skū*), Wanda (born 1877), Polish harpsichordist; authority on early music; came to the United States 1941.
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 Land'seer, Sir Edwin Henry (1802-78), English animal painter L-61
 artist and his dogs, *picture* L-61
 sculpture on Nelson Memorial, *picture* L-186
 Lands End, promontory of Cornwall, forming westernmost point of England, *map* E-270a
 Landslut (*lānts'lut*), Germany, quaint old town on Isar River in Bavaria, 35 ml. n.e. of Munich; pop. 81,000; from 1255 to 1503 capital of duchy of Bavaria-Landshut; Napoleon defeated Austrians (1809).
 Land'steiner, Karl (1868-1943), American bacteriologist and pathologist, born Vienna, Austria; member Rockefeller Institute for Medical Research; won Nobel prize in medicine 1930 for work in classifying different types of human blood.
 Landsting (from Norse *land*, land, and *ting*, or *thing*, parliament), certain legislative bodies in Scandinavian countries; in Denmark, upper house of parliament; in Sweden, county councils.
 Land tenure. *See also* Eminent domain; Land grants; Lands, public
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 Latin America L-67g: Brazil B-226a; Central America C-133a, d; Chile C-207d; Ecuador E-155; Mexico M-140
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 ruined land restored, *pictures* E-145f
 South America, *photograph* S-204
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 Land Utilization Office, in U. S. government U-230
 Lane, Edward William (1801-76), English Arabic scholar; spent many years between 1825 and 1849 in Egypt; published 'Account of the Manners and Customs of the Modern Egyptians'
 'Arabian Nights' A-244, 245
 Lane, Franklin Knight (1864-1921), U.S. secretary of interior 1918-20
 quoted on American flag F-83
 Lane, Joseph (1801-81), statesman and general, born Buncombe County, N. C.; 1820 settled in Vanderburg County, Ind.; Indiana senator 1844-46; made major general for heroic action in Mexican war; governor of Territory of Oregon 1848-50; Oregon delegate to Congress 1850-58, senator 1859-61; candidate for vice-president on secession ticket 1860.
 Lane, Ralph Norman Angell. *See in Index* Angell, Sir Norman
 Lane, Sir William Arbuthnot (1858-1943), English physician; consulting surgeon Guy's Hospital, Hospital for Sick Children, French Hospital; London; author books on operative treatment of fractures and of cleft palate.
 Lan'franc (died 1089), English prelate and scholar, born in Italy, archbishop of Canterbury 1070-89; as chief counselor of William the Conqueror played important part in fixing Norman rule upon English church and people.
 Lang, Andrew (1844-1912), British scholar, poet, and writer on many subjects ('Ballads in Blue China'; 'Custom and Myth'; 'History of Scotland'; 'Blue', 'Red', 'Yellow', and other fairy books).
 Lang, Cosmo Gordon (born 1864), English divine; 97th Archbishop of Canterbury, 1928-42; Canon of St. Paul's 1901-1908; Archbishop of York, 1908-28.
 Langdell, Christopher Columbus (1826-1906), American lawyer and educator; born New Boston, N. H.; after 1870 dean of Harvard Law School; introduced "case system" of teaching, which revolutionized methods of law schools.
 Langdon, John (1741-1819), American merchant and politician, born Portsmouth, N. H.; an ardent supporter of the Revolution, he financed Stark's expedition against Burgoyne and built ships for navy; one of first senators from New Hampshire; governor 1805-11.
 Langdon, William Chauncey (born 1871), American pageant dramatist quoted P-12
 Langensalza (*lāng'en-sāl'tsā*), Germany, town in Prussian Saxony on River Saale, n.w. of Erfurt; pop. 13,000; Hanoverians defeated Prussians in 1866, but surrendered on arrival of Prussian reinforcements.
 Langerhans, isles of, in pancreas, discovered by Robert Langerhans,

- German pathologist (1849-88): G-100
- Langford, Nathaniel Pitt** (1832-1911), public official, explorer; vigilante in Montana; explored Yellowstone region (1870), and was its first superintendent after it became a national park; wrote 'Vigilante Daye and Ways': N-15
- Langland, Willham** (1830?-1400?), English poet, supposed author of 'Vision of Piers Plowman', a religious allegory attacking corruption in church and state.
- Langley, Samuel Pierpont** (1834-1906), American physicist, astronomer and inventor, born Roxbury, Mass.; did notable work in aerodynamics and exploration of infrared portions of the solar spectrum airplane A-68-9, pictures A-66, 68
- Langley Field, Norfolk, Va.** N-149 wind tunnel, picture A-79
- Langmuir, Irving** (born 1881), American chemist, born Brooklyn, N.Y.; engaged in research for General Electric Company after 1909; invented gas-filled tungsten lamp, condensation vacuum pump; won Nobel prize in 1932
- Lewis-Langmuir** theory of atomic structure A-361, diagram A-360
- Pupin teaches P-368a
- Langobards** ("long beards"). See in *Index* Lombards
- Langres (lān'grē)**, ancient town in e. France on "Plateau of Langres"; pop. 6,000; makes cutlery; famous strategic point since Roman days.
- Langshan**, a breed of poultry P-338, picture P-337
- Langton, Stephen** (1150?-1228), English cardinal and archbishop of Canterbury, usually credited with being the first to divide the Bible into chapters; leader in demand for Magna Carta
- triumphs over King John J-222
- Langtry, Lily (Emily)** (1852-1929), English actress, noted for her beauty, born Island of Jersey and known as the "Jersey Lily"; first great success in 'She Stoops to Conquer'.
- Languages** L-61d-63, Outline L-62. See also in *Index* Alphabet; Grammar; Philology; Writing; and the principal languages and language groups by name
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- Europe E-320
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- Latin once world language L-67
- Norse runic N-186
- numbers speaking chief tongues P-172
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- Romany, or gipsy G-90
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- Languedoc (lān-gū-dōk')**, former province in s. France, whose capital was Toulouse; famous for wine: map F-179
- origin of name F-195
- people F-172
- Langue d'oc**, French dialect F-195
- Languedoc Canal**, or Canal du Midi, France, connects Mediterranean with Garonne River, thence to the Atlantic: C-67
- Langue d'oïl (lān-gū dō-ōl')**, French dialect F-195
- Lanier (lā-nēr')**, Sidney (1842-81), American lyric poet L-63-4
- Lanidae (lā-nī-dē)**, the shrike family of birds S-135
- Lan'ital**, a synthetic wool P-245L, 246
- Lan'olin**, preparation of purified fat obtained from raw sheep's wool, used as base for various ointments.
- Lans'downe, Henry Charles Keith Petty-Fitzmaurice**, 5th Marquis of (1845-1927), British statesman; governor general of Canada 1883-88; viceroy of India 1888-93; secretary of foreign affairs 1900-06, during which time an alliance was made with Japan and friendship cemented with France, leader of Unionist party in House of Lords for several years; favored a moderate peace after 1st World War.
- Lansdowne, Henry Petty-Fitzmaurice**, 3d Marquis of (1780-1863), English statesman, chancellor of the exchequer at 25, a Liberal leader and advocate of parliamentary reform, abolition of slavery, free trade, and Catholic emancipation.
- Lansdowne, Pa.**, borough, residential suburb of Philadelphia, about 5 mi. w.; pop. 10,837.
- Lan'sing, Robert** (1864-1928), American lawyer and authority on international law, born Watertown, N.Y.; counsel for U.S. in Bering Sea and Alaska boundary arbitrations; secretary of state in Wilson's cabinet during 1st World War.
- Lansing, Mich.**, capital, on Grand River 80 mi. n.w. of Detroit; pop. 78,753; automobile and automobile parts, awning, gasoline and Diesel engines, state school for blind: map M-153
- capitol, picture M-154b
- Michigan State College M-155
- Lauston, Tolbert** (1844-1913), American inventor, born Troy, Ohio; invented monotype which he patented in 1887.
- Lanta'na**, a perennial plant and shrub of verbena family with flat clusters of flowers that turn from pink to orange, then to red, white, or blue depending upon species; native of tropical America; cultivated for ornament in southern U. S.; introduced also into India, Ceylon, and Hawaii; has become noxious weed in Hawaii, where insects are imported to prey on it.
- Lantern** L-57, pictures L-58
- colonial, picture A-171
- lighthouse L-132
- magic, or stereopticon S-285-6
- story of Diogenes D-69
- Lantern fish**, a name given to certain soft-rayed deep-sea fishes which have phosphorescent luminous organs to help them to see in the depths of the ocean; many of them are of grotesque shape with huge heads, enormous eyes, large mouths, and slender fragile bodies: picture O-199
- Lanterns, Feast of**, in China H-322
- Lanthanum**, a rare earth metal, table C-168
- Lanuvium (lā-nū-vi-ūm)** (modern Lanuvio), ancient city of Latium, 19 mi. s.e. of Rome; member of Latin League; conquered by Rome 338 B.C.; temple of Juno.
- 'Lanzas, Las' (lās lānthās)**, painting by Velasquez, picture P-18
- Laoag (lā-dō-āg')**, Philippine Islands, seaport on Laoag River near n.w. coast of Luzon; pop. 42,000; trade in rice, indigo, sugar: map F-10b
- Laocoön (lā-dō-kō-ōn)**, in Greek mythology, Trojan priest of Apollo; warns countrymen against wooden horse: T-144
- statue of R-143, G-168, S-53
- Laodamia (lā-dō-d-mī'ā)**, legendary Greek heroine, wife of Protesilaus; celebrated in Wordsworth's poem 'Laodamia'. See in *Index* Protesilaus
- Laodicea (lā-dō-d-i-sē'ā)**, name of several ancient Asiatic cities in realms extending from Aegean Sea to India; *Laodicea ad Lycum* (modern Denizli, Turkey, 120 mi. s.e. of Smyrna), once wealthy trade center; founded probably 3d century, B.C.; site of one of 7 primitive churches of Asia (Rev. i, 11); *Laodicea ad mare* (modern Latakia, Syria), pride of the Caesars, noted for ruins of triumphal arch built possibly by Septimius Severus.
- Laoghis (lā'ish)**, also Leix, formerly Queen's, county in s.e. Ireland, in Leinster province; 664 sq. mi.; pop. 50,000; farming, dairying, textile manufacturing.
- 'Laokoon', a book by Lessing** (1766), in which the functions of poetry and painting are defined and distinguished; one of the most important books in the history of art.
- Laomedon (lā-dō-mē-dōn)**, in Greek mythology, founder and king of Troy; father of Priam
- Poseidon aids F-315
- Laon (lān)**, city in France, 80 mi. n.e. of Paris; pop. 20,000; fortified by Romans; Bliicher defeated Napoleon 1814; captured by Germans 1870, 1914, and 1940
- recovered by Allies (1918) W-164
- Laos (lā'ōs)**, or Laotians, a people of Indo-China; division of Thai or Shan race: T-73a
- Laos, protectorate in French Indo-China**; about 82,000 sq. mi.; pop. 2,000,000: I-73a-d, map I-73b
- Lao-Tse (lā'ō tsē)** (604? B.C. - ?), Chinese philosopher and metaphysician; contemporary with Confucius; founder of Taoism: picture C-221k
- teachings C-221e, R-71-2
- La Pasture, Roger de**. See in *Index* Weyden, Roger van der
- La Paz (lā pās)**, largest city and seat of government of Bolivia, South America; pop. 300,000; commercial center of agricultural and mining region; university: B-189
- map S-208b
- climate S-205f
- La Paz, Mexico**, port, in Lower California, on Bay of La Paz; pop. 12,000: C-35, map M-133
- La Peltrie, Marie Madeleine de** (1603-71), French Roman Catholic nun, born Alençon; founder of Ursuline convent at Quebec 1639; conducted school for Indian and French girls until 1642, when she joined colonists under Maisonneuve and helped to found Montreal.
- La Pérouse (lā pē-rōz')**, Jean-François de Galaup, Count de (1741-88), French navigator; in war with England took British forts on Hudson Bay 1782; rounded Cape Horn, explored west coast of the Americas, discovered strait of Pérouse between Hokushu and Sakhalin, Japan; lost at sea after reaching Australia, 1788; wreckage of his ships found 1826, on coral reef n. of New Hebrides.
- Lapis lazuli (lā'pis lās'yū-lī)**, a semi-precious stone G-28
- Afghanistan A-30
- Lapithae (lāp'i-thē)**, in Greek mythology, race related to the Cen-

Key—cāpe, āt, fūr, fāst, whāt, fāll; mē, yēt, fērn, thēre; ice, bīt; rōw, wōn, fōr, nōt, dā; cūre, bāt, ryde, fūll, bārn;

taurs, dwelling in Thessaly
Centaur in battle with C-130
Theseus aids T-79

Laplace (*lâ-plâs'*), Pierre Simon, Marquis du (1749-1827), French mathematician and astronomer, called "Newton of France"; proved stability of solar system
nebular hypothesis N-61, P-233

Lapland, region in extreme n. of Norway, Sweden, Finland, and Russia L-64, map N-173
lamps and lighting L-56
people L-64, S-337, picture N-177
reindeer, picture T-123

La Plata (*lâ plâ'tâ*), Argentina, city 35 mi. s.e. of Buenos Aires, 5 mi. from port of Ensenada on Plata estuary; pop. 170,000; National University; center of meat-packing trade; map A-279

La Plaine, Rio do. See Plata River

La Porte, Ind., city 59 mi. s.e. of Chicago near several lakes; pop. 16,180; woolen goods, motor pistons, farm implements.

Lap'pet, in weaving S-150

Lappet moth, moth of the silkworm family; so named because larvae have lobes or lappets at sides of bodies; picture I-85

Lapps, natives of Lapland L-64, S-337, picture N-177
racial affinity, diagram R-93

Lapu'ta, in 'Gulliver's Travels', an island visited by Gulliver, picture S-344

Lapwing, green plover, or peewit, an Old World plover (*Vanellus vanellus*) having iridescent bottle-green plumage on upper parts, crested head, and white under parts; noted for its wailing cry; its eggs are esteemed as a delicacy.

Laramie, Jacques (1785?-1821), Canadian trapper; in Colorado foothills and s.e. Wyoming 1816-20; first explorer of upper Laramie River; killed by Indians.

Laramie, Wyo., trade center on Laramie River; pop. 10,627; W-196, map W-194
state university, picture W-195

Laramie Mountains, in s.e. Wyo.; highest point 9030 ft.

Larboard (*lâr'bôrd* or *lâr'bêrd*), old term for the left, or "port" side of a boat; perhaps derived from Middle English "ladeborde," the loading side; "port" was substituted for larboard to avoid confusion with "starboard," the right side of a boat.

Larceny, in law, illegal taking and carrying away of personal property belonging to another with the purpose of depriving the owner of them; distinguished from burglary, which involves housebreaking, and robbery which involves personal violence; the laws of most states distinguish between grand and petty (or petit) larceny, depending on the amount involved.

Larch, a tree L-64-5

Larcom, Lucy (1826-93), American poet; born Beverly, Mass. In her youth she was a factory worker, and some of her contributions to the factory magazine won praise of Whittier with whom she later compiled two books; editor *Our Young Folks*; outstanding for poems of life in New England ('Childhood Songs'; 'Wild Roses of Cape Ann and Other Poems'); L-210

Lard, rendered pork fat F-18-19
best hog type for H-316
oleomargarine content O-221, 223

Larder beetle, a beetle (*Dermestes lardarius*) whose larvae feed on smoked meats, cheese, and other animal substances; also called the bacon beetle.

Lardner, Ring W. (1885-1933), American writer of humorous stories showing keen insight and reproducing everyday conversation of ordinary men and women; born Niles, Mich.; sports writer on newspapers ('You Know Me, Al'; 'Gullible's Travels'; 'How to Write Short Stories'; 'Round Up'; 'First and Last').

Laredo, Tex., city on Rio Grande River about 140 mi. s. of San Antonio; agricultural, stock-raising, oil and coal interests; pop. 38,274; ships vegetables and fruit; cottonseed-oil, brick and tile, packing-house products, hats: T-56, map T-56, picture T-59

Lares (*lâr'êz*), in Roman mythology, protecting deities of the household, closely associated with the Penates in festival for Vesta V-291

Largetooth aspen, tree (*Populus grandidentata*) of willow family, native from Nova Scotia to North Carolina, westward to Manitoba. Grows to 60 ft.; leaves oval, to 4 in. long, margins with large teeth. Also called large poplar, popple, and large American aspen. Wood, soft, weak, light, grayish-white; used for paper pulp, excelsior, matches, and boxes; sold as "poplar," "cottonwood," and "aspen."

Larghetto (*lâr-gê'ttô*), direction in music meaning not quite so slow as largo.

Largo (*lâr'gô*), a slow musical movement; 40-70 metronome beats to the minute.

Largs (*lâr'gêz*), Scotland, watering place in Ayrshire, on Firth of Clyde; 80 mi. s.w. of Glasgow; yachting center
battle of (1283) T-31

Lariat, noosed rope used by cowboys for catching cattle or horses C-114

Laridae (*lâr'i-dê*), bird family, including gulls and terns.

Larissa (*lâr-ris'â*), Greece, city in Thessaly on Salambria River; pop. 24,000; transit trade, textile manufactures; important city in ancient times; map B-18

Lark, a group of small perching birds forming the family *Alaudidae*; name also applied to other birds that are like or likened to members of the lark family, such as the meadowlark, the titlark, or lark sparrow; L-65
horned L-65, color plate B-140; care of young B-128; courtship flight B-125; nest, picture L-65

Lark bunting B-273

Lark sparrow, bird of middle and w. U. S., head streaked chestnut and white; tall white-edged; good singer; also called lark finch.

Larkspur, or delphinium L-65, pictures P-273, L-65
planting, directions for G-7, 10
poisonous properties P-274

'L'Artésienne' (*lâr-lâz-yên'*), painting by Van Gogh, picture P-26

La Rochefoucauld (*lâ rôsh-fô-kô'*), François, Due de (1613-80), French courtier and writer, born Paris; engaged in court intrigues against Richelieu and Mazarin; famous for his 'Maxims' and 'Mémoires'.

La Rochelle (*lâ rô-shêl'*), fortified seaport of w. France; pop. 48,000; once great maritime city and center of French Protestantism

besieged by Richelieu R-106, T-80
Edict of Nantes H-279

La Rothière (*lâ rô't-yêr'*), village in France, 125 mi. s.e. of Paris; Allies under Bücher defeated French under Napoleon (1814).

Larsa, ancient Sumerian city in s. Mesopotamia, on w. bank of old Euphrates, 15 mi. s.e. of ancient Erech; famous ruins are the temple libraries and important documents.

Larva, in zoology L-66, I-85-8
ant A-212
bee B-73-78, pictures B-75, 77, I-87
beetle B-82, pictures B-82, 83; Japanese, picture I-93; June J-228
caterpillar C-96-100, B-284, pictures C-98, 99, B-286; corn borer, pictures I-93; cutworm C-418; hornet-moth I-92; silkworm S-146-7, picture S-144
eel E-191
flea F-106
housefly F-128, picture F-129
lacewing fly I-91, picture I-91
liver fluke W-180a
May-fly M-94
mosquito, pictures M-267
mussels C-259
nymph distinguished from I-88
oyster O-262-4
tadpole: frog F-207-8; salamander S-12-13; toad T-101
wasp, picture W-34

Larynx (*lâr'ingks*), the voice organ V-330-1, picture L-219
changes in adolescence A-21

La Salle (*lâ sâl'*), René Robert Cavelier, Sieur de (1634-87), French explorer L-66-7, A-146
Arkansas history A-299
assisted by Marquette and Joliet reports J-228
explorations, map U-242
Hennepin, his assistant H-274
Illinois history I-13
Indiana history I-50
Milwaukee history M-181
Mississippi River history L-66, 67, A-146
Tennessee history T-48
Texas history T-59

La Salle, Ill., manufacturing, trade, and mining center on Illinois River, 82 mi. s.w. of Chicago; pop. 12,812; coal mining, zinc smelting, and manufacture of cement, clocks, farm machinery; map I-13

La Salle College, at Philadelphia, Pa.; Roman Catholic institution for men, founded 1693; arts and sciences, business administration.

Las Casas (*lâs kâ'sâs*), Bartolomé de (1474-1566), Spanish historian and missionary to West Indies L-87, L-67s

Las Cruces (*lâs krp'sâs*), N.M., town 40 mi. n.w. of El Paso, Tex., in rich agricultural region; pop. 8385; New Mexico College of Agriculture and Mechanic Arts near by; map N-97

La Serena, Chile, iron-shipping center about 225 mi. n. of Valparaíso; pop. 21,000; historic cathedral and convents: C-207a, map C-206

Lashio, town in Burma, 125 mi. n.e. of Mandalay; s.w. terminus of Burma Road; pop. about 5000.

Las'ker, Eduard (1829-84), Prussian statesman; important service in civil consolidation of German empire.

Las Navas de Tolosa (*lâs nâ'vâs dâ tô-lô'sâ*), battle of (1212) S-230

Las Palmas (*lâs pâlmâs*), important port on e. coast of Grand Canary Island (Spanish); pop. 75,000; largest city and former capital of the group; cable station.

La Spezia (*lâ spê'tsya*), Italy, city 50 mi. s.e. of Genoa, on Bay of Spezia; pop. 110,000; important

û=French u, German ü; jem, jo; thin, then; ñ=French nasal (Jean); sh=French j (s in azure); k=German guttural ch

- naval harbor; shipbuilding; winter resort; trade center for olive oil, fruits, marble.
- Lassa**, or **Lhasa**, capital of Tibet in s.; pop. about 50,000: T-90, map A-332c, picture T-90
- Lassalle** (lā-sāl'), Ferdinand (1825-64), famous German socialist, founder of German social democratic movement; his vivid paradoxical personality and life formed basis of Meredith's "Tragic Comedians".
- Las'sen Peak**, volcanic peak in n. California; erupted 1914-17: vast lava beds; height 10,453 ft.: N-22b
- Lassen Volcanic National Park**, Calif. N-22b
- Lasso** (lās'sō), Orlando di (1532?-1594), celebrated musical composer, forerunner of Palestrina; born Mons, Belgium, where he became choir boy; taken to Italy by patron, Viceroy of Sicily; court musician to Duke of Bavaria at Munich; composed more than 2,000 works; much of his church music ranks with that of Palestrina.
- Last**, in shoe-making S-132, W-139
- "Last Couple Out,"** game P-252
- "Last Days of Pompeii,"** novel by Bulwer-Lytton giving detailed and vivid picture of life in Pompeii before city was destroyed by eruption of Mount Vesuvius (79 A.D.); realistic description of eruption.
- Lastex**, trade name for a rubber filament wrapped with cotton, silk, or rayon fibers; gives great stretch to fabrics woven from it; invented 1931.
- "Last Judgment, The,"** painting by Michelangelo M-148
- "Last of the Mohicans, The,"** novel of James Fenimore Cooper, one of the "Leather-Stocking Tales"; thrilling story of frontier life; romantic idealization of the Indian Uncas.
- "Last Supper, The,"** enamel by Raymond, picture E-265
- "Last Supper, The,"** painting by Leonardo da Vinci V-300, picture V-299
- Las Vegas** (lās vāg'ās), Nev., city 80 mi. w. of Boulder Dam, in agricultural and mineral district; railroad and tourist center; irrigated lands in vicinity; pop. 8422: map N-77
- Las Vegas, N. M.**, agricultural and live stock center 42 mi. s.e. of Santa Fe; composed of modern city (pop. 5941) and old town (pop. 6421); market; Indian and Mexican craft shops: N-98-9, map N-97
- Laszlo** (lā'slō). See in *Index* Ladislaus, Saint
- Lat** (lāt), monetary unit of Latvia; nominal value about 19½ cents.
- Latakia** (lā-tā-kā'), Syria, French Lattaquié (lā-tā-kyā'), Mediterranean port 115 mi. n. of Beirut; pop. 25,000; produces famous Latakia tobacco; ancient Laodicea.
- Latchstring** P-221c
- Lateen' sail** B-166
- La'tent heat**, heat absorbed or released when matter changes state, as when ice melts or water freezes W-43-4
- Lateral pass**, in football F-150, pictures F-151b, c
- La'teran, The**, palace in Rome; original building belonged to Lateranus family; taken from them by Nero; later given to pope by Constantine; used as residence by popes until 14th century; present palace, built in 16th century, now contains two museums.
- Lateran Church** (Basilica of St. John Lateran), the cathedral of Rome and first in rank of Catholic churches in the world; originally built in 4th century, probably as a chapel in Lateran Palace; destroyed and rebuilt several times; last major restoration in 14th century: R-145
- Lateran Councils**, church councils held in the Lateran Palace and Church at Rome at various times
- Fifth Council (1512-17)** censors books P-348
- Lateran treaty, or Concordat of 1929**, settled a 59-year-old dispute over Papal lands; Italy recognized sovereignty of Vatican City: P-227
- creates papal state**, picture P-55
- Laterite** (lāt'ēr-it), soil S-191d
- Late Stone, or Neolithic, Age** M-46, 47, 48, S-293, pictures C-118, M-47, color plate M-48c-d
- Latex** (lāt'ēks), milky juice secreted by various plants G-190
- guayule** G-181d, 182
- yields rubber** R-164, 165-6, pictures E-142c, R-165
- Latex foam sponge** R-168
- Lathe** (lāth), a machine tool T-111, pictures T-110b, 112
- tool alloys** A-131
- turret** T-112
- Lathrop** (lā'thrūp), Dorothy P. (born 1891), American writer and illustrator of children's books, born Albany, N. Y.; Caldecott award 1938 for "Animals of the Bible" illustrations, pictures L-157, S-300
- Lathrop, George Parsons** (1851-98), American journalist and poet, born Hawaiian Islands; married Rose, daughter of Nathaniel Hawthorne; assistant editor *Atlantic Monthly*; editor *Boston Courier*; founder American Copyright League ("Rose and Roof Tree").
- Lathrop, Julia Clifford** (1858-1932), American social worker, born in Rockford, Ill.; important work at Hull House, Chicago; chief 1912-21 of U. S. Children's Bureau, first woman bureau chief; author of articles on child welfare, care of insane and civil service.
- Lathyrus** (lā'thī-rūs), a genus of plants of the pea family, including the sweet pea S-341
- Latifundio**, in Latin America, a large landed estate C-133a
- Latimer, Hugh** (1490?-1555), English Protestant reformer and martyr, bishop of Worcester, whose homely practical preaching largely drove the English Reformation home to the people; burned at stake (with Nicholas Ridley) exhorting his fellow-martyr, "Be of good cheer, Master Ridley, and play the man; we shall this day light such a candle by God's grace in England as I trust shall never be put out."
- Latin America**, collective name for the 20 nations of southern North America, Central America, South America, and the West Indies speaking languages of Latin origin: L-67a-r, Outline H-310e-f. See also in *Index* Central America; South America; and names of separate countries
- architecture** L-67j
- art and music** L-67j-k
- bibliography** L-67r, S-211
- commerce** L-67m-o: trade with North America, photograph S-208a
- education** L-67k-m
- flags, historic** F-100, color plate F-90
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- history** L-67h-i, o-a. See also in *Index* South America, history
- labor** L-67n-o, m. See also in *Index* Peonage
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- significance of term L-67b
- World War, 2d W-178w
- Latin American literature** L-67s-x
- bibliography** L-67a
- Latin Empire**, established by Crusaders in 1204: C-406
- Latin language** L-67-8
- alphabet** A-134b, 135, chart A-134a
- Bible translation (Vulgate)** B-103
- English language influenced by** E-281-282, L-67: words derived from W-188-9
- in medieval schools** E-172, 173
- pronunciation** L-70
- romance languages derived from** R-128, P-171: French F-105; Italian I-153-4; Spanish S-235
- value of study** G-128
- writing, styles** B-176-7
- Latin League**, confederation of cities of Latium in central Italy, existing from earliest historic times till 338 B.C. R-132
- Latin literature** L-68-70, Outline L-82
- Augustan Age** A-364, L-68-9
- Cicero** C-13
- Claudian** C-236
- drama** D-93, 98, L-68
- Middle Ages** E-173
- Renaissance** E-173, R-74
- Vergil** V-284
- Latin Quarter**, student and artist district in Paris P-72
- Latins**, in ancient times, inhabitants of Latium; also modern Italians, French, and Spanish: I-162
- contribution to civilization** C-247
- early history** R-128-30, R-132
- legend of rule of Aeneas** A-27
- outlook on life** L-67c
- Latin School**, Boston B-201
- Latinus**, in Roman mythology, king of Latium and father of Lavinia, wife of Aeneas.
- Latitude**, distance in degrees north and south from equator L-70-1
- finding at sea** N-48, picture N-48;
- early methods** N-49
- "horse latitudes"** W-112, picture W-113
- longitude distinguished from** L-195
- map-making** M-58-9
- pendulum affected by** P-109
- Latium** (lā'shī-ūm), ancient district in middle Italy, inhabited by Latins R-128, 129
- Aeneas**, legendary ruler A-27
- Lato'na**, in Roman mythology, mother of Apollo and Diana; same as Greek Leto
- Niobe and N-146**
- La Tour, Charles Amador de** (1596-1666), French governor of Acadia 1628-35; quarrelled with Charnisay over governorship; regained post after death of Charnisay in 1650.
- Latrobe, Pa.**, borough 34 mi. s.e. of Pittsburgh in agricultural district; pop. 11,111; iron and steel mills, textile plant; coal and coke; St. Vincent College.
- Lattaquié** (lā-tā-kyā'), Syria. See in *Index* Latakia
- Latter-Day Saints** M-258-9. See also in *Index* Mormons
- Lattimore, Eleanor Frances** (born 1904), American author and illustrator of children's books, born Shanghai, China; works are based on her own experiences ("Little Fear"; "Seven Crowns"; "Junior").
- La Tuque** (lā tūk), Quebec, lumbering center on St. Maurice River 85 mi. n. of Three Rivers; pop. 7871; pulp and sawmills, sash and door factories: map C-50c

Lat'via, or **Let'via**, republic of Soviet Russia, annexed 1940; on Baltic Sea; 25,402 sq. mi.; pop. 1,900,000; cap. Riga: L-71, maps P-278, E-326*f*, flag F-95, color plate F-89 Riga R-107-8

Lauan (*lā-wān'*), the wood of several species of trees of the lauan family (*Dipterocarpaceae*) native to the Philippine Islands, nearby islands, and S. Asia; often called Philippine mahogany. Red lauans have dark red or red brown heartwood and light red sapwood; white lauans have light red gray heartwood and whitish sapwood. Used for interior finish, furniture, small boats, and caskets.

Laud, William (1573-1645), English prelate, archbishop of Canterbury; tried to suppress dissent; beheaded on charge of treason advisor of Charles I C-147 Oxford University and O-259 John Winthrop and W-119

Laudanum, alcoholic solution of opium, containing 33 grains of opium or 3.3 grains of morphine to each fluid ounce
antidote P-275

Lauder, Sir Harry MacLennan (born 1870), British variety actor, a great favorite for his Scottish songs composed by himself and sung in character; knighted 1919.

Laudonnière (*lō-dō-nyār'*), René Goulaine de, 16th-century French Huguenot noble; accompanied Jean Ribault's expedition (1562) to what is now South Carolina; established Fort Caroline colony on St. John's River (1564), but governed badly; wounded in Menéndez' attack, escaped to Europe and wrote memoirs.

Laue (*lou'ē*), Max von (born 1879), German physicist, professor at Berlin University; Nobel prize winner (1914)

crystallography C-409

X-ray spectra X-200

Laughter pigeon P-216

Laughing gas, or nitrous oxide (N₂O), an anesthetic A-196
discovery of properties A-196, D-21, L-191

Laughing gull, or black-headed gull, G-186, pictures G-187

Laughing jackass, an Australian bird A-372

Laughing Philosopher. See in Index Democritus

Laughlin (*lā'flin*), James (1806-82), American manufacturer and philanthropist, born Ireland; one of group which developed Pittsburgh as an iron center.

Laughlin, James Laurence (1850-1933), American political economist, born Deerfield, Ohio; head of department of political economy, University of Chicago, 1892-1916; prepared monetary reform scheme for Santo Domingo government, 1894-5; author of numerous works on economics.

Lancelot. See in Index Lancelot

Launceston (*lān'sēs-ton*), England, quaint old town in Cornwall 21 mi. n.w. of Plymouth; pop. 4000; George Fox, the Quaker, imprisoned here in 1655.

Launceston, 2d city of Tasmania in n.e. on Tamar River; pop. (with suburbs) 33,000; trade with Victoria and South Australia: A-372*a*

Launching, of steamships S-127-8

Laundry L-71

Chinese method, in China C-215

cost and labor C-276
hydro-extractor, principle C-134
marking ink I-79
soap S-175-9

Launfal (*lān'fāl*), Sir, knight of the Round Table and steward to King Arthur, in the Arthurian legends; hero of Lowell's 'Vision of Sir Launfal'.

La Unión (*lā ũn-yōn'*), El Salvador, thriving town and chief port on Union Bay at e. end of El Salvador; pop. 8000.

Laura (1308-48), lady loved by Petrarch and celebrated in his poems R-73

Lauraceae (*lā-rā'sē-ē*), the laurel family of plants, including laurel, bay, and sassafras L-72

Laurana (*lā-g-rā'nd*), Francesco da (1420?-1502), sculptor and medalist of Dalmatian origin; worked chiefly in Italy and France, stressed design rather than realism; remarkable beauty and simplicity in 'A Princess of the House of Naples'.

Laureate, poet P-266

Laurel, Miss., commercial and manufacturing city 76 mi. s.e. of Jackson in yellow pine region; pop. 20,598; owes rapid growth to large sawmills; cotton and cottonseed-oil, pine oils, plastic board; dairying, meat packing, vegetable canning; railroad shops: map M-200

Laurel, name given various flowering shrubs L-72
cherry-laurel, picture P-273
crown of poets and heroes P-266, D-14

evergreen leaves E-340

myth of Daphne and Apollo D-14

source of word 'laureate' P-266

Laurel-wood. See in Index Madrona

Laurencin (*lō-rān-sān'*), Murie (born 1885), French painter, born Paris; a fanciful modernist with highly individual style; representative works are portrayals, in soft, pale colors, of wispy feminine creatures.

Laurens (*lō-rāns'*), Henri (born 1885), French sculptor, born near Paris; identified with modernists who emphasized purely plastic forms: S-62

Laurens, Henry (1724-92), statesman, born Charleston, S. C.; president of Continental Congress 1777-78; one of commissioners to negotiate peace after Revolution: R-02

Laurens, John (1754-82), American soldier in Revolutionary War, son of Henry Laurens; confidential secretary to George Washington, whom he accompanied in all his battles; because of gallantry and courtesy called the 'Bayard of the Revolution'; killed in a skirmish shortly before peace was concluded.

Laurent, Robert (born 1890), American sculptor, born France; fine feeling for mass and plane; achieved vital beauty in direct carvings in stone, marble, and wood; especially noted for figures in alabaster and plant forms in wood.

Laurentian Library, in Florence, Italy L-105

Laurentian Plateau, highland area in Canada L-72, A-21, maps N-150*a*, U-200

Adirondacks A-21

Michigan M-154

Laurentides Park, Quebec, about 30 miles n. of Quebec City; 3565 sq. mi., 1500 lakes; trout fishing.

Laurentius, Saint. See in Index Lawrence

Laurie, Alexander (born 1892), horticulturist, born France; emigrated to U.S. 1902; became professor of horticulture Ohio State University in 1929

subirrigation P-245*h*

Laurier (*lō-rē-yā'*), Sir Wilfrid (1841-1919), Canadian statesman L-73, C-62
quoted C-49

Laurium, or **Laurion**, Greece, hill range 20 mi. below Athens
silver mines G-163

Lausanne (*lō-sān'*), Switzerland, beautiful city 1 mi. n. of Lake Geneva; pop. 76,000; 13th-century cathedral; university: S-352

Lausanne, Treaty of (1912), closed Turco-Italian War; gave Tripoli to Italy.

Lausanne, Treaty of (1923), revised treaty of Sèvres, extending Turkey's territory: T-164, W-174, G-162

Lausanne, Treaty of (1932), reduced German reparations W-177
Dardanelles D-15

Laut, Agnes C. (1871-1936), Canadian author, born Stanley, Ontario; fascinating and authoritative historical books on early explorers and pioneer life in the Northwest ('The Conquest of the Western Empire'; 'Pathfinders of the West'; 'Vikings of the Pacific'; 'Life of Cadillac').

Lauterbrunnen (*lou'tēr-brūn-ēn*), Switzerland, village 84 mi. s.e. of Bern; pop. 2500; lace manufactures; picture S-350

Lautrec, Henri de Toulouse. See in Index Toulouse-Lautrec

Lauts (*louts*), natives of Borneo B-196

Lauzon (*lōzōn'*), or St. Joseph (*sān zhōsēf'*), Quebec, town on St. Lawrence River 1½ mi. n.e. of Lévis; pop. 7084; aerated waters, trunks, boxes; shipyard.

Lava (*lā'vā*), molten rock discharged from volcanoes or intruded between rock strata under the ground L-73, V-331-2, picture V-334. See also in Index Lava soil

Etna lava fields E-313

Galápagos Islands, picture S-205*e*

igneous rocks formed by solidification of M-184, G-39

Idaho beds I-7, picture I-10

Vesuvius, eruptions of V-291; destruction of Herculaneum P-301; destruction of Pompeii P-209-300

Lava Beds, national monument in California N-22*b*

Laval (*lā-vā'l*), Pierre (born 1833), French statesman; rose in few years from obscurity to dominant position in French politics; minister of public works 1925; later was under-secretary of state, senator, minister of labor, foreign minister, and in 1931-32 and 1935-36 premier; vice-premier 1940, after German victory; advocate of collaboration with Hitler; became chief of Vichy government April 1942.

Lavalleja (*lā-vā-yā'hā*), Juan Antonio (died 1853), liberator of Uruguay from Brazilian rule 1825-28; dictator 1827-28; insurgent against later governments.

Laval-Montmorency (*lā-vā'l mōn-mō-rān-sē'*), François Xavier de (1622-1708), first Roman Catholic bishop of Quebec; remarkable influence largely fixed paternalistic character of French colonial government; founded (1668) Seminary of Quebec; Laval University named in his honor.

Laval University, Quebec, Roman Catholic institution for men,

ñ=French *n*, German *n*; ñ, gem, *g*, *h* in, then; ñ=French nasal (*Jean*); zh=French *j* (*as* in azure); k=German guttural *ch*

founded 1852 by the Seminary of Quebec (1663); theology, law, medicine, arts; branch at Montreal; various affiliated schools: Q-6
L'Avare (*lâ-vâr*). See in *Index* 'Avare, L'
Lava soil, from volcanoes V-331, M-185
Central America C-132
Hawaiian Islands H-240
Idaho I-7
Java J-203
n.w. United States U-192
Lavater (*lâ-vâ'têr*), Johann Kaspar (1741-1801), Swiss poet and mystic, founder of physiognomy, the art of reading character, especially from facial features.
Lavatera (*lâ-vâ-tê'râ*), a genus of plants and shrubs of the mallow family, native to warm regions of the world. Leaves lobed, often maple-like; flowers, 5 petals, in axils of leaves or in loose clusters, white through red; entire plant somewhat hairy or grayish; tall species used as windbreaks; also called tree-mallow.
Lavender, an aromatic shrub of the mint family native to s. Europe perfume made from, *pictures* P-123
Lavender lace flower. See in *Index* *Trachymene*
'Laven'gro', a semi-autobiographical story by George Henry Borrow dealing with his early adventures and his wanderings with the gypsies.
Laveran (*lâ-v'rân*), Charles Louis Alphonse (1845-1922), French physician; Nobel prize in medicine 1907: M-268
La Vérendrye (*lâ vâ-rân-drê*), Pierre Gaultier de Varennes, Sieur de (1685-1749), French Canadian explorer and fur trader, born at Three Rivers, Canada; pushed westward in search of the Western Sea; visited Mandan Indian villages on the Missouri. Two of his sons, François, Chevalier de la Vérendrye, and Louis Joseph de la Vérendrye, visited North Dakota and possibly reached the foothills of the Rocky Mts.: *picture* F-224
Vérendrye National Monument N-226
Winnipeg, Canada W-114
Lavery (*lâ-vêr-ê*), Sir John (1857-1941), British painter, born Belfast, Ireland; renowned chiefly for portraits and figure work done in a broad style; also landscape and historical works; knighted 1918.
Lavinia, in Roman mythology, daughter of Latinus and Amata; betrothed to Turnus but married Aeneas who killed Turnus in single combat (Vergil's 'Aeneid' books 7, 10, and 12).
Lavinium, ancient town of Latium, 17 mi. s. of Rome; said to have been founded by Aeneas and named after his wife, Lavinia.
Lavoisier (*lâ-vûz-êr*), Antoine Laurent (1748-94), French chemist, born in Paris; son of a rich merchant; founded modern theory of chemical action; particularly in combustion; executed in French Revolution: F-45, *picture* C-178
conservation of matter C-187a
head of powder works W-105
oxygen studies O-262
Lavongai (*lâ-vông-gâ-ê*), island in Bismarck Archipelago, formerly New Hanover; mandate of Australia; 460 sq. mi.; pop. 5000: *map* P-106
Lavra, famous monastery of Greek church, at Kiev, Russia K-16
Law, Andrew Bonar (1858-1928), British statesman, born New

Brunswick, Canada, of Scottish parentage; removed to Scotland in childhood; made a fortune as iron merchant; began career in Parliament in 1900, becoming leader of Conservative party; helped to form coalition government in 1st World War; premier 1922
Stanley Baldwin and B-16
Law, John (1671-1729), Scottish financier, born in Edinburgh; lived in London until convicted of killing a man in a duel; fled to the Continent, where he proposed new government credit systems based on inflation, paper money, and colonial exploitation; appointed controller general of French finance (1720) and soon brought about disastrous panic; escaped to Italy and died in Venice
"Mississippi Bubble" L-208
Law L-73-4. See also in *Index* Banks and banking; Commercial law; Courts of Justice; Factories and factory laws; Government; Government regulation of industry; International law; Jury; Labor legislation; Social legislation. For list of the more common legal terms see *table* on the next page
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Henry II reforms H-275-8; **Magna Carta foundation of** M-33
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wills W-98
Law, The, division of the Old Testament P-383
Law, merchant, for regulating medieval trade R-78
Law, scientific. See in *Index* name of law, as Ohm's law
Lawn, originally a fine linen fabric made in Laon, France; now a light thin cotton material, white, dyed, or printed.
Lawn, a stretch of grass G-137
Asiatic beetle pest I-90
planting G-9
Lawns, strainers used for pottery clay P-327
Lawn tennis T-49-50, *pictures* T-51
Law of comparative costs I-110a
Law of Reciprocity, in international trade I-110c

Law of the Fire, Camp Fire oath C-41
Lawrence, Charles Lanier (born 1882), American airplane builder, born Lenox, Mass.; designed and perfected radial, air-cooled engine called "Wright Whirlwind"; president Wright Aeronautical Corporation.
Lawrence, Saint, also Laurentius, or Lorenzo (died 258?), Christian martyr, called "the Deacon," friend of the poor; commemorated August 10; meteorites appearing about that time known as "tears of St. Lawrence"
Escorial built in honor of M-22
martyrdom M-72
Lawrence, Abbott (1792-1855), American manufacturer and diplomat, born Groton, Mass.; minister to Great Britain 1849-52; founded Lawrence Scientific School of Harvard
Lawrence, Mass., named for L-78
Lawrence, Amos (1786-1852), American merchant and philanthropist, brother of Abbott Lawrence, born Groton, Mass.; did much to establish cotton textile industry in New England; gave freely to schools and charities. His son Amos Adams (1814-86) founded Lawrence College.
Lawrence, Charles (1709-60), English soldier and statesman, born Portsmouth, England; governor of Nova Scotia 1756-60; during his rule the deportation of the Acadians took place.
Lawrence, D(avid) H(erbert) (1885-1930), English novelist, poet, and painter. His novels are characterized by a sensitive delineation of nature and individual emotion, with a tendency toward the morbid and abnormal ('Sons and Lovers'; 'The Rainbow'; 'Aaron's Rod'). He also wrote essays ('Twilight in Italy') which have an enduring quality of richness of description, and poems, some of which were illustrated by his own drawings ('Birds, Beasts and Flowers'): E-288
Lawrence, Ernest O. (born 1901), American physicist, born Canton, S.D.; on faculty University of California 1926-; Nobel prize 1939 for invention of cyclotron and work on structure of atoms
cyclotron, picture P-195
Lawrence, Gertrude (born 1898), English actress; won first success singing 'Limehouse Blues' 1924; starred in comedies in England and America ('Private Lives'; 'Tonight at 8:30'; 'London Calling'; 'Candiedelight'; 'Susan and God'; 'Sky-lark'; 'Lady in the Dark').
Lawrence, Sir Henry Montgomery (1806-57), English brigadier general and colonial administrator at siege of Lucknow L-211
Lawrence, James (1781-1818), American naval hero L-74-5
Lawrence, John L. M., Baron (1811-79), British viceroy and governor general of India, called "evildoer of India" because his relief of Delhi during the Mutiny (1857) maintained British dominion; brother of Sir Henry Lawrence.
Lawrence, Josephine (born 1891?), author and journalist, born Newark, N.J.; wrote first children's story ever broadcast, 1921; children's books: 'Christine', 'Wind's in the West'; books for adults, 'Years Are So Long', 'If I Have Four Apples', and 'But You Are Young'. deal with the problems of lower middle-class family life.

A LIST OF COMMON LEGAL TERMS

Administrator. The person appointed by the court of probate to settle the estate of one who died without a will; distinguished from an executor.

Assignment. Transfer of property rights by agreement, usually in writing. Sometimes "for the benefit of creditors."

Attachment. Preliminary legal seizure of property to insure satisfaction of judgment which may be obtained in pending suit. Often loosely used to mean levy by sheriff under writ of execution after judgment.

Bailment. An agreement by which the bailor transfers to the bailee the possession of, but not the title to, tangible personal property for the accomplishment of a specific purpose, on the understanding that, when the purpose has been accomplished, the identical personal property will be returned to the bailor.

Chattel. Tangible personal property, e. g., a hook, a coat, a pencil, etc.

Chattel mortgage. A conditional transfer of rights in personal property as security for an existing debt or obligation.

Chose in action. A right to recover a chattel, a debt, a sum of money, or damages for breach of contract, which right cannot legally be enforced without bringing an action in a court of law. Distinguished from a chattel (chose in possession).

Conditional sale. An agreement for the sale of goods under which the possession of the goods is delivered at once to the buyer and the property in the goods is to be transferred to the buyer at a future time upon the payment of all or part of the price, which is usually to be paid in installments.

Confiscation. Appropriation of private property to public use without compensation.

Contempt of court. Any willful disobedience or disregard of a court order or misconduct in the presence of a court; punishable by fine or imprisonment, or both.

Contract. An enforceable promise; an agreement between two or more competent persons to do or not to do some lawful act for a consideration.

Corporation. A fictitious legal person, having rights and duties independent of the rights and duties of the real persons who constitute it as shareholders.

Deed. A written instrument used generally for conveying a freehold interest in real property from one person to another, either through sale or gift. A quitclaim deed is one which purports to convey only such rights as the grantor has, whatever they may be; a warranty deed purports to convey specifically described rights, usually a perfect title.

Dower. A forced share which the surviving spouse has by law in the estate of the deceased spouse. Originally dower referred only to the share of the surviving wife; the share of the surviving husband was called curtesy.

Equity. A system of law designed to furnish remedies for wrongs which were not legally recognized under the common law of England, or for which no adequate remedy was provided by the common law.

Escrow. A written agreement between two parties providing that a third party will hold money or property until the conditions of the agreement are met.

Estate. A person's entire property, more particularly property left at death; an estate is said to be closed when the decedent's will has been carried out, or when, if no will was left, the estate has been divided in accordance with the laws of the state.

Evidence. In law, all facts, testimony, and documents presented for the purpose of proving or disproving a question under inquiry.

Executor. In law, the person designated by another to carry out the provisions of his will.

Felony. A major crime, such as murder, larceny, or robbery, punishable by death or by imprisonment in a state or federal penitentiary, and by automatic loss of citizenship.

Fine. Money, demanded as a penalty for an offense; many statutory offenses are punishable by fine or imprisonment, or both.

Fixture. An article, once a chattel, but later so attached to real property, either physically or by close association in use, that it becomes legally a part of the real property to which it is attached, and is therefore treated as real property by the law.

Foreclosure. The legal process by which a mortgagee may terminate the mortgagor's nonstatutory equitable right to redeem the mortgaged property after breach of the condition of the mortgage.

Forgery. The making or altering of any written instrument for the purpose of fraud and deceit; common examples are the signing of another person's name to a check, and increasing the amount of a check by changing the figures.

Freehold. An interest in real property for an uncertain length of time, which may last for life.

Garnishment. The process by which a judgment creditor seizes the money of his judgment debtor which is owed to, or held for, the debtor by a third person; garnishment proceedings usually involve salary or wages due from an employer, or money owed or held by a bank.

Guarantee. In law, a contract by which one person is bound to pay a debt or perform a duty in case the person who is primarily liable fails to do so.

Hearsay. Factual evidence, the truth of which the testifying witness does not know of his own knowledge.

Heir. From Latin word *heres*, one entitled to inherit; heir presumptive is one who will inherit if no nearer heir is born to ancestor; heir apparent is one who will inherit if he outlives ancestor, as eldest son.

Indictment. A formal written accusation presented by a grand jury to the court in which it has been sworn; an indictment is required in most states before a trial for felony.

Joint tenants. Holders of property, whose rights to the property are equal and mutual; one right is always the right of survivorship, by which, at the death of one tenant, the surviving tenant or tenants acquire all the rights of the deceased tenant by operation of law.

Judgment. The declaration, by a court of competent jurisdiction, of the rights and duties of the parties to a lawsuit which has been submitted to it for decision.

Larceny. Illegal taking and carrying away of personal property belonging to another with the purpose of depriving the owner of them; distinguished from burglary, which involves house-breaking, and robbery which involves personal violence; the laws of most states distinguish between grand and petty (or petit) larceny, depending on the amount involved.

Lease. An instrument conveying the possession of real property for a fixed period of time, usually in consideration of rent to be paid at regular intervals.

Legacy. A gift of money or of personal property by will. Strictly a gift by will of personal property other than money is called a bequest. Both terms are distinguished from a devise, which is a gift of real property by will.

Libel. In law a false defamation expressed in writing, printing, or picture, which injures the character or reputation of anyone and exposes him to public ridicule or contempt; distinguished from slander.

Lien. A legal claim against property, usually as security for a debt or for work done on the property or for the satisfaction of a judgment. Strictly a lien is merely the right to retain the lawful possession of the property of another until that other fulfills a legal duty to the lienor.

Manslaughter. The unlawful killing of a human being without malice or premeditation, distinguished from murder (or murder in the first degree) which requires malicious intent.

Misdemeanor. A minor crime, less serious than a felony, punishable by fine, imprisonment, or both, in a city or county jail rather than in a penitentiary, and not involving the loss of citizenship.

Notary public. An officer authorized by the state to attest or certify legal documents.

Perjury. The offense of willfully making false statements, when bound by oath to tell the truth, in the course of judicial proceedings.

Power of attorney. An instrument by which one person is authorized to act on behalf of another so as legally to bind that other.

Probate. Strictly the process of proving before a court of probate that a will has been properly executed according to statutory requirements. Loosely the word also includes the whole process of administering the estate of the testator in accord with the directions in the will.

Riot act. Legislation passed by British Parliament, 1714, commanding that a certain proclamation of dispersement be read by a justice, sheriff, mayor, or other authority wherever 12 or more persons are riotously assembled; origin of expression "to read the riot act."

Riparian rights (Latin *ripa*, river bank). Legal rights of owners of land bordering on a river or lake.

Sedition. Conduct directed against a state, tending toward insurrection, but not amounting to treason. Treason is defined by the Federal Constitution as consisting only of levying war against the United States or of adhering to their enemies, giving them aid and comfort.

(Continued on the next page)

A LIST OF COMMON LEGAL TERMS—Continued

Slander. A false defamation of the character or reputation of anyone, by spoken words, signs, or gestures; distinguished from libel.

Title. The right to ownership of property; the sum total of legally recognized rights to property. Many of the rights constituting title may, however, be transferred to others by the owner without causing the owner to lose his title.

Tort. A civil or private wrong for which

one is entitled to sue for damages (fraud, slander, libel, alienation of affection, assault); a breach of contract is not a tort.

Treason. See Sedition

Treasure-trove. Ownerless coinage metal (gold or silver) in plate, coin, or bullion form, found hidden in the earth or concealed in a house or other private place. In England, trove belongs to the state; in the United States, in the

absence of statute, it belongs to the finder.

Trespass. A wrong to person or property by a willful and forcible act; chiefly used to refer to unlawful entrance to another's land or to unlawful violation of another's person.

Trust. An agreement by which the legal and equitable rights to property are split so that the legal rights are transferred to one person and the equitable rights to another.

Lawrence, Sir Thomas (1769-1830), English court painter, born at Bristol; supported family with portrait sketches at age of 10; flattering but often superficial likenesses of English beauties and European sovereigns; the successor of Reynolds as most celebrated portrait painter of his day ('Mrs. Siddons', 'Princess Lieven', 'Calmarly Children', 'Pinkie').

Lawrence, Thomas Edward (1888-1935), British soldier, explorer, and scholar; called "Lawrence of Arabia"; L-75
quoted A-240

Lawrence, William (1850-1941), American Episcopal bishop, grandson of Amos and son of Amos A. Lawrence; bishop of Mass. 1893-1926 ('Life of Amos A. Lawrence', 'Memories of a Happy Life').

Lawrence, William Beach (1800-81), American jurist; acting governor of Rhode Island; authority on international law.

Lawrence, Kan., farming and manufacturing center on Kansas River 83 mi. w. of Kansas City; pop. 14,390; Haskell Institute for Indians, state university; K-5, map K-4, picture K-6

Lawrence, Maes., manufacturing city on Merrimack River, 30 mi. from sea; pop. 84,323; L-75-6, map M-82

'Lawrence', Perry's flagship, in battle of Lake Erie P-128

Lawrence College, non-sectarian institution at Appleton, Wis.; founded 1847; college of liberal arts, conservatory of music, institute of paper chemistry, and graduate school; named for Amos A. Lawrence (1814-86), a Boston merchant who was its chief founder.

Laws of heredity H-284, 286, B-115

Lawson, Henry (1867-1922), Australian poet A-376

Lawson, Robert (born 1892), artist and illustrator of children's books; born New York City; drawings are a fine combination of imagination and humor; illustrated 'Story of Ferdinand' by Munro Leaf; 'I Hear America Singing', by Whitman; and 'Pilgrim's Progress' illustration, picture S-303a

Lawson, Victor Fremont (1850-1925), American editor and newspaper publisher, born Chicago; proprietor of Chicago *Daily News*, which he endeavored to maintain without political bias; president Associated Press 1884-1900; advocacy of government savings bank caused him to be called "the father of the postal savings bank in America."

Lawson's cypress. See in Index Port Orford cedar

Lawson spruce, a Pacific coast cypress C-420

Lawton, Henry Ware (1845-99), American general, born Manhattan, Ohio; in Civil War rose from sergeant to brevet-colonel; commanded American troops which took El Caney in Cuba. In 1898; killed in attack upon Filipinos at San Mateo, Luzon.

Lawton, Okla., industrial city 80 mi. s.w. of Oklahoma City, in irrigated agricultural district; pop. 18,055; cotton products, brooms, cement products; oil interests; Ft. Sill near by; Cameron State School of Agriculture; map O-216

Lawyer, vocation V-323

American colonies U-235

Lawyer fish, burbot, or ling, freshwater fish (*Lota maculosa*), only member of cod family found exclusively in fresh water.

Laxative, or physic, a medicine H-372

Layamon (lā'yā-mōn), English poet and priest, lived about 1200; author of the 'Brut', metrical chronicle of Britain, one of monuments of early English language.

Lay'ard, Sir Austen Henry (1817-94), English diplomat, archeologist, and writer; excavated ruins of Nineveh ('Monuments of Nineveh'); N-148

Layering, in horticulture G-138

Layette, for the baby B-4

'Lay of the Last Minstrel', poem by Scott S-48-9

Laysan (lā'yā-sān) Island, small coral island belonging to U. S., in Pacific in group lying n.w. of Hawaiian Islands; breeding place for many birds; map P-100

'Lays of Ancient Rome', a collection of ballads by Macaulay M-2

'How Horatius Kept the Bridge', story T-88-9

Laz'arus, beggar in parable of the rich man and the poor man (Luke xvi, 19-30).

Lazarus, brother of Martha and Mary; raised from the dead by Christ (John xi).

Lazarus, Emma (1849-87), American-Jewish poet, born New York City; published first poems and translations at 18; did philanthropic work among Jewish refugees from Russia; worked for Jewish nationalism ('Alde'; 'Songs of a Semite').

Lazear, Jesse William (1866-1900), American physician, born Baltimore; with U.S. Army Yellow Fever Commission in Cuba; for experimental purposes allowed himself to be bitten by mosquito carrying yellow fever germ, and died; M-270

Lazuli (lā'zū-lī) bunting, a bird of the finch family B-273

Lazzari (lā'd-zā'rā), Virgilio (born 1887), operatic basso, born and educated in Italy; joined Chicago Civic Opera Co., 1918.

L. C. L. (less than carload), freight shipments R-44

Lea, Fanny Heaslip (born 1884), American writer of short stories and novels; born New Orleans, La.; ('Quicksands'; 'Happy Landings').

Lea (lā), Henry Charles (1825-1909), American publisher and church historian, remembered for 'A History of the Inquisition of Middle Ages' and 'History of the Inquisition of Spain', the standard books in English in their fields.

Lea, Homer (1876-1912), soldier and author, born Denver, Colo.; although a hunchback, he was able to find a military career in China where he became a general in the service of Sun Yat-sen; author of two prophetic works on Japan's plans for imperial expansion—'The Valor of Ignorance' and 'The Day of the Saxon'.

Leacock (lē'cōck), Stephen Butler (born 1869), Canadian educator and humorist, born England; professor of political economy at University of Chicago 1899-1903, at McGill University 1903-36; author of biographies of Dickens and Mark Twain, and of books on history, economics, and political science; won a wider public with his delightful nonsensical sketches ('Literary Lapses'; 'Behind the Beyond').

Lead (lēd), S. D., city in Black Hills; pop. 7520; map S-218

Homestake mine S-218, 219

Lead (lēd), a metallic chemical element L-76, C-176, C-168

acetate (sugar of lead) P-32; in secret ink I-79-80

alloys A-132

arsenate, an insecticide S-263

carbonate, basic (white lead) P-32

chromate (chrome yellow) C-230, P-32

electrical conductivity, picture E-222

electrochemical activity E-239

gasoline, anti-knock P-150, L-78

glass making G-102, 104, L-76

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metal working M-124

mining L-76

mold in electrotyping E-243

monoxide (litharge) L-76

ore deposits, characteristic M-186

oxide; imitation diamonds G-26; pottery glaze P-328

paints and driers P-32, 32a

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peroxide, in storage batteries S-293

powder (old style) A-132

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production, annual world average L-76, pictograph M-189

radioactive minerals contain R-33, L-76, M-183

red lead (minium) L-76
refining L-76, M-122
rubber goods R-164
silver associated in ores S-152
storage batteries contain S-293-4
sulphide (galena) L-76
tetraethyl P-150, L-76
tungstate, a paint T-150
vinegar attacks P-32, V-300
waste salvaged C-342
weight: atomic L-76; comparative, of metals I-134
white lead P-32

'Lead, Kindly Light', hymn by Newman N-94

Leader stroke, in lightning L-135, 136
Lead line, in navigation N-49

Lead mold, a process in electrotyping E-243

Lead pencils P-106-8

Leadville, Colo., mining city in w. center; pop. 4774; gold, silver, molybdenum mines; one of highest towns in America (almost 2 mi. above sea level): map C-310

Leadwort, a plant. See in Index Plumbago

Leadwort family, or Plumbaginaceae (*plūm-bāg-i-nā'sē-ē*), a family of plants and shrubs including the prickly-thrifts, sea-lavender, leadwort, and statice or thrift.

Leaf, Munro (born 1905), author, born Hamilton, Md.; writer of humorous adult and juvenile books; 'Story of Ferdinand', illustrated by Robert Lawson.

Leaf. See in Index Leaves

Leaf, or foil, term applied to thin pliable sheets of metal
aluminum A-138
gold G-113-4
silver S-152

Leaf butterfly, also called Oriental, Indian, dead-leaf, or Kallima butterfly P-354, pictures P-355, I-85

Leaf-chaffer, a variety of plant-eating beetle B-83

Leaf coral, picture C-363

Leaf-cutter bee B-78, color plate W-32a-b
mandibles, picture I-82

Leaf-cutting ant, or parasol ant, picture A-213

Leaf-hopper, name given to various bugs of the family *Jassidae*, which infest wheat, grape, roses, sugar cane and other plants
killed by spraying S-262-3
spreads plant diseases I-90

Leaf-insect, an insect of tropical regions, with wings amazingly leaf-like in form and color; family *Phasmidae*: I-84, picture I-85

Leaflets L-89

Leaf River, in Quebec, outlet of Lake Minto in n.w.; flows n.e. to Ungava Bay; 295 mi. long: map C-50c

Leaf rollers, popular name of the *Tortricidae*, a family of small moths, many of whose larvae roll leaves to form a shelter.

Leaf rust, a fungous growth which attacks leaves R-199

League, an ancient unit of long measure which in modern usage varies in different countries from about 2 to about 4 miles: table W-67

League Island Navy Yard. See in Index Philadelphia Navy Yard

League of Nations L-77-8. See also in Index Mandates; Plebiscite
Article X opposed W-111
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Harding's policy H-219
headquarters at Geneva G-80

International Labor Organization L-45, C-205

limitation of armaments P-92
narcotic drugs regulation N-12
Permanent Court of International Justice L-78

Silesia dispute W-174
slavery investigation S-161-2

Taft supports T-4
U.S. rejects U-250, W-174

Versailles, Treaty of W-173
Wilson's policy L-77, W-111

League of Three Petticoats, in Seven Years' War S-84

League of Women Voters, National, non-partisan association of women interested in the promotion of good citizenship and government W-132

Le'ah, elder daughter of Laban and unlabeled first wife of Jacob (Gen. xxix).

Leahy (*lā'hē*), William Daniel (born 1875), U. S. naval officer, born Hampton, Iowa; chief of naval operations 1937-39; U. S. ambassador to Vichy, France, Nov. 1940-April 1942; named President F. D. Roosevelt's personal chief of staff July 1942.

Leamington (*lēm'ing-tōn*), England, health resort in Warwickshire, 90 mi. n.w. of London; pop. 29,000; mineral springs.

Leander, in Greek legend, lover of Hero H-287

Leaning Tower of Pisa P-222, picture P-223

Galileo's experiment G-143

Leap year C-22

'Lear (*lēr*), King', tragedy by Shakespeare K-22

chronology and rank S-100e

Lear, Edward (1812-88), English artist and writer, noted for Ilmericks, comic illustrations L-138

Learning L-79-82, P-380

character development C-141
child development C-199-202

conditioned reflexes R-64
education E-182-3

memory M-113
reading R-57

study S-309-10

Leary, Herbert F. (born 1885), naval officer, born Washington, D. C.; placed in command at sea, under General MacArthur, in s.w. Pacific, March 1942.

Lease, in law, an instrument conveying the possession of real property for a fixed period of time, usually in consideration of rent to be paid at regular intervals.

"Lease-lend." See in Index Lend-Lease

Leasing system, in manufacturing shoe manufacturing S-132

Least bittern B-151

Least common multiple A-286-7

Least grebe G-151

Least sandpiper S-173

Least tern G-186

Least weasel W-59

Leather L-83-7

artificial L-85, castor bean in C-95; cellulose, chart C-123; pyroxylin P-373

book bindings B-182-3
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morocco M-260, L-85

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patent leather L-85; ultra-violet rays used on R-15

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shagreen: ass A-338; sawfish S-33; shark S-102

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shoes S-180-3, C-273-4

sources L-83

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Leather-back turtle T-166-7, 168, picture T-167

Leather beetle, *Dermestes vulpinus*; larvae feed on animal substances, especially skins.

Leatherette, imitation leather L-85

Leatherstocking, nickname of Natty Bumppo, scout, hero of Cooper's 'Leatherstocking Tales'.

'Leatherstocking Tales', by Cooper C-354

Leavened (*lēv'ēnd*) bread B-229

ancient Hebrews P-235

Leavening

baking powder B-15

yeast Y-204-5

Leavenworth, Henry (1783-1834), American soldier and Indian fighter; built army posts, later known as Fort Snelling (1819) and Fort Leavenworth (1827); stationed at Fort Atkinson, Neb. (1821-24).

Leavenworth, Kan., manufacturing and shipping center in n.e. on Missouri River; pop. 19,220; coal interests; in suburbs are Ft. Leavenworth and state and U.S. penitentiaries; in early days outfitting point for cross-prairie wagon trains: K-5, map K-4

Leaves L-88-90

arrangement L-89

autumn coloration L-89-90

breathing and eating P-238-9, picture L-88

collecting L-89

coloring matter P-237-8, L-88, 90

evaporation from T-131, L-88

flood prevention function F-106c-d

form L-90; compound L-90, L-179, M-56; simple L-90

growth, pictures N-35, B-204, T-138, H-290

light, response to L-88-9, P-241-2, picture L-88: compass plants C-327, L-88; eucalyptus E-314; fittonia F-121; sensitive plants S-78, P-243

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reduction by desert plants P-243, C-10, picture P-235

transpiration P-240

venation (veins) L-88: parallel, palmate, and pinnate L-89

water plants W-48, 47

'Leaves of Grass', poems by Walt Whitman W-95

Leavitt torpedo, in U. S. Navy T-114

Lebanon, Pa., industrial city 26 mi. n.e. of Harrisburg; pop. 27,206; in coal, limestone, and iron-mining district; iron and steel products, textiles, boots and shoes, paper boxes; settled in 1700 by German immigrants: map P-112

Lebanon (from Arabic *laban*, "to be white"), ancient Mediterranean country n. of Palestine; snow-capped Lebanon Mountains noted for whiteness of their limestone and for cedars used in ancient times; cedars of Lebanon supplied by Hiram of Tyre for Solomon's temple (I Kings, v); modern Lebanon a

- republic in Syria; cap. Beirut; grows tobacco, olives, grapes, cereals; exports silk, fruits, carpets.
- Lebanon**, cedar of C-121
- Lebanon Mountains**, the western range of two parallel ranges of mountains in w. Syria, separated by a narrow rich valley; e. range is Anti-Lebanon; average height about 7000 ft.
- Lebanon Valley College**, at Annville, Pa.; founded 1866 by United Brethren church; arts and sciences.
- Lebensraum** (*lě'běns-roum*), German word, meaning "living space," slogan of German imperialism; used by Adolf Hitler to express Germany's demand for new territories and economic self-sufficiency.
- Ls Blane**, Georgette (1875-1941), French actress and writer, first wife of Maurice Maeterlinck; as actress of Comédie Française created emotional rôles, especially Charlotte Corday and Monna Vanna; after marriage 1901 known as interpreter of husband's plays ('The Blue Bird for Children').
- Leblanc** (*lě-błān'*), Nicolas (1742-1806), French chemist, won prize offered (1776) by French Academy for method of making soda from common salt; lost both property and his patent rights in French Revolution.
- Leblanc process**, for making soda and by-products S-189, 190
- LeBlon** (*lě blōn*), Jacques Christophe (1667-1741), French engraver; the father of modern color printing; E-298
- Le Bourget** (*lě bgr-shē'*) Flying Field, Paris L-147
- Le Bris** (*lě brē'*), Jean-Marie (died 1872), French sea captain and inventor; patterned first glider after albatross; A-68
- Lebrun** (*lě-brūn'*), Albert François (born 1871), 14th president of France; minister of liberated territories, 1917-19; president of the Senate 1931-32; president of France 1932-40.
- Lebrun**, Charles (1619-90), French artist, born Paris; as one of founders of Academy of Painting and Sculpture and director of Gobelins tapestry manufactory he practically directed French art tendencies during his lifetime; court artist under Louis XIV.
- Lebrun**, Elisabeth Vigée (1755-1842), French portrait and landscapes painter, born Paris; painted portraits of royal family including 30 of Marie Antoinette; left France 1789 because of Revolution; returned 12 years later to home near Paris where she mingled with most celebrated people of her day; picture E-333
- Lechfeld** (*lěk'fēlt*), battle of (955), fought on plain of Lechfeld in Bavaria; Magyars defeated by Otto I; H-361
- Lech** (*lěk*) River, rapid and tortuous stream rising in Vorarlberg Alps at height of 6120 ft.; flows n. through Bavaria 180 mi., joining Danube below Donauwörth.
- Lechthin** (*lěs'thin*), a fatty substance in animal tissue B-109, G-108
- Lecky**, William E. H. (1838-1903), Irish historian and publicist ('A History of European Morals'; 'History of England in the Eighteenth Century') quoted G-52-3
- Leclairs** (*lě-kłēr'*), E. J. (1801-72), French social scientist; founded system of profit sharing.
- Leclanché** (*lě-kłān-shē'*), Georges, invented, 1868, electric battery with carbon and zinc poles, from which dry cell was developed; E-214
- Leclanché cell** E-214-5
- Leecoc** (*lě-kōk'*), Alexandrs Obarles (1832-1918), French musical composer, born Paris; produced many light operas, melodious, gay, and lively ('La Fille de Madame Angot'; 'Giroflé-Girofla').
- Leecompton**, Kan., town on Kansas River, 15 mi. e. of Topeka; pop. 260; settled 1854 by pro-slavery men and was their headquarters during contest with free-state settlers for control of the state.
- Leecompton Constitution**, adopted by pro-slavery faction of Kan. in 1857 Buchanan urges acceptance B-256
- Le Conte** (*lě kōnt'*), Joseph (1823-1901), American scientist, born Liberty County, Ga.; helped popularize geology ('Elements of Geology'; 'Religion and Science').
- Leconte de Lisle** (*lě-kōnt' de lēl'*), Charles Marie (1818-04), French poet, chief of modern Parnassian school ('Poèmes antiques').
- Lecoq de Boisbaudran** (*lě-kōk' dē bōi-bō-drān'*), Paul Émile, called François (1838-1912), French chemist, discoverer of gallium, samarium, dysprosium, holmium.
- Le Creusot** (*lě krē-sō'*), town in e. cent. France, 75 mi. n.w. of Lyons; pop. 30,000; famous iron and armaments works, textiles.
- Lecturer**, in college U-258
- Leda** (*lědā*), in Greek and Roman mythology, a fair mortal wooed by Zeus, or Jupiter, in the guise of a swan.
- Ledgor A-5-7**
- Ledyard**, John (1751-89), American adventurer, born Groton, Conn.; dreamed of opening up fur trade in Pacific Northwest, glimpsed on voyage (1776-80) with Captain Cook; enlisted interest of John Paul Jones, Jefferson, Sir Joseph Banks; failed in two attempts to cross Siberia on foot; died during expedition into Africa.
- Lee**, Ann (1736-84), founder of the American Society of Shakers, born England; called by her followers "Mother Ann."
- Lee**, Arthur (1740-92), American diplomat, born Stratford, Va.; brother of Richard Henry Lee; served as American representative in various European countries during Revolutionary War.
- Leo**, Charles (1731-82), American Revolutionary general, born England; dismissed for insubordination; involved in treasonable intrigues not discovered until after his death; R-87, 90
- Lee**, Fitzhugh (1835-1905), American Confederate Civil War general, born Fairfax County, Va.; nephew of Robert E. Lee; military governor of Havana after Spanish-American War.
- Lee**, Francis Lightfoot (1784-97), signer of Declaration of Independence; born Stratford, Va.; brother of Richard Henry.
- Lee**, Henry (1766-1818), American Revolutionary soldier, called "Light Horse Harry," born Dumfries, Va.; governor of Virginia; father of Robert E. Lee quoted on Washington W-22
- Leo**, Jason (1803-45), American Methodist missionary and Oregon pioneer, born Stanstead, Quebec, then part of Vermont; went west with Wyeth's expedition (1834) to open mission among Flathead Indians; aided by Dr. McLoughlin in settling in Willamette valley; established other missions in Clatsop region and at The Dalles.
- Lee**, Joseph (1862-1937), social worker, born Brookline, Mass.; known as "father of American playground movement"; organized and was president of National Recreation Association from 1910; president War Camp Community Service during 1st World War ('Play in Education'). National Joseph Lee Day celebrated July 28.
- Lee**, Mary Randolph Custis (Mrs. Robert E. Lee) L-90
- Lee**, Richard Henry (1732-94), American Revolutionary leader L-90
- Lee**, Robert E. (1807-70), Confederate general L-90-2, C-253-4, 255, pictures L-91, G-81
- Antietam A-221**, M-3 birthday celebrated H-320 birthplace, picture V-308a captures John Brown B-250 Fredericksburg F-193 Gettysburg G-81-2 Grant and G-132-3, L-92
- horns at Arlington U-225**: national memorial N-22e
- Texas prairies**, prophecy quoted T-58
- Lee**, Sir Sidney (1859-1926), English author and educator; editor 'Dictionary of National Biography'; works include 'Life of Shakespeare', 'Life of Queen Victoria'.
- Lee**, William (died 1610), English clergyman and inventor K-31
- Lee**, river in Ireland C-366
- Leeb** (*lēp*), Wilhelm, Ritter von (born 1876), German general; staff officer in 1st World War; led drive on Leningrad in 1941.
- Leeboard**, a slab of wood or metal hung over the leeward side of sailing canoes and other small craft to prevent drifting sideways.
- Leech**, John (1817-84), English caricaturist, whose *Punch* cartoons Ruskin called "the finest definition and natural history of the classes of our society, the kindest and subtlest analysis of its foibles."
- Leech**, a bloodsucking worm L-92-3
- Leeches**. See in *Index* Litch
- Leech Lake**, in n. Minnesota; 20 mi. long, map M-192
- Leeds**, 6th largest city in England, on Aire River; pop. 485,000; L-93, map E-270a pottery P-332
- Leeds and Liverpool Canal** L-93
- Lee-Enfield rifle**
- United States adopts in 1st World War T-52**
- Lock**, herb similar to onion O-225 worn on Saint David's Day H-322
- Lee Mansion**, national memorial in Virginia N-22e
- Leeuwarden** (*lě-wūr-dēn*), Netherlands, cap. of province of Friesland; pop. 48,000; flourishing trade in cattle, grain, fish.
- Leeuwenhoek** (*lě-wēn-hyuk*), Anthony van (1632-1723), Dutch microscopist, born in Delft; discovered red corpuscles of the blood and the circulation of blood in the capillaries; M-156, B-158
- Leeward Islands** (*lě-wērd* or *lā-wērd*), British colony in West Indies n. of Windward Islands and s.e. of Puerto Rico, comprising dependencies Antigua, St. Kitts-Nevis, Montserrat, and British Virgin Islands; 420 sq. mi.; pop. 95,000; names sometimes applied to other West Indian islands, such as the chain

Key—caps, dt, fūr, fāst, whqt, fāll; mē, yēt, fērn, thāre; ice, bīt; rōw, wōn, fōr, nōt, dq; cūre, bāt; ryde, fūll, bārri;

- extending westward of Trinidad; W-72c, map W-72c
- Leeway**, in sailing, sidewise motion of a ship caused by pressure of wind; must be allowed for in setting accurate sailing courses; B-164
- Lefebvre** (*lè-fèv'rè*), Jules Joseph (1836-1912), French painter; eminent as a painter of ideal heads; celebrated also for historical and allegorical paintings ('Lady Godiva'; 'Mignon').
- Lefèvre d'Étaples** (*lè-fèvr d'è-tà-pl*), Jacques (1455?-1536), French theologian and scholar, born Étaples; also known as Jacobus Faber Stapulensis; pioneer of French Protestantism; condemned by Sorbonne for certain critical works on Bible, but protected by Francis I and Margaret of Navarre; translated Bible into French.
- Left**, term used in European politics P-291
- Left-handedness** C-199
- heredity** H-286
- Leg** F-146
- animals, *pictures* F-147
- bones S-156, *pictures* S-154, 155, 156
- caterpillar C-98
- centipedes, number C-131
- crawfish, *picture* C-391
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- evolution in horse, *pictures* H-340
- first aid when broken F-65
- insects I-87, *picture* I-88: grasshopper, *picture* M-157; moth, *picture* B-284
- muscles M-304, *picture* M-305
- seal S-68, *picture* S-70
- spider S-258
- Legacy**, in law, a gift of money or of personal property by will. Strictly, a gift by will of personal property other than money is called a bequest. Both terms are distinguished from a devise, which is a gift of real property by will.
- Le Gallienne** (*lè gāl'i-èn*), Eva (born 1899), American actress, daughter of Richard Le Gallienne; born London, England; educated in France; made American debut at 16; founder and director of Civic Repertory Theatre, New York, in which she produced plays of high quality at popular prices ('The Swan'; 'The Master Builder'); wrote 'At 33'.
- Le Gallienne, Richard** (born 1866), American critic, essayist, and poet, born Liverpool, England; 'Prose Fancies', 'The Quest of the Golden Girl', 'Pieces of Eight' are imaginative prose sketches; 'Odes from the Divan of Hafiz', 'English Poems', and other volumes of poems include many graceful lyrics.
- Legal tender**, money that may legally be offered in payment of debt; in the U. S., treasury and bank notes and silver dollars are legal tender to any amount, silver coins up to 10 dollars, and cent and 5-cent pieces to not over 25 cents.
- Le Gascon** ("the Gascon"), French book binder of the 17th century; real name unknown.
- Legaspi** (*lè-gās'pè*), formerly Albay, Philippine Islands, port of Luzon on Bay of Albay; pop. 42,000; cap. of Albay province; map A-332c
- Leg'ate** (from Latin *legare*, to appoint), specifically an ecclesiastical or diplomatic representative of the pope; term occasionally used to signify any ambassador or diplomat.
- Legation**, residence or place of business of a diplomatic minister D-71
- Legato**, in music; in a connected, flowing manner.
- Legend** (from Latin *legere*, "to read," originally "to gather"), a fictitious or improbable story based on tradition and some fact, as the legends of King Arthur; originally stories of saints and martyrs. *See also* in *Index* Folk-lore
- Legend**, the title or description under a picture, diagram, or graph G-138c
- Legend of Sleepy Hollow, The**, story by Washington Irving I-151
- Legendre** (*lè-zhàn'drè*), Adrien Marie (1752-1833), French mathematician; a leader in introducing the metric system; helped prepare great centesimal trigonometric tables; made important contributions to geodesy.
- Léger** (*lè-zhà'*), Fernand (born 1881), French painter; early work simple abstractions, later turned to cubism and flat-patterned landscapes.
- Legerdemain** (*lèg-èr-dè-màn'*), sleight of hand M-325-c
- Leger** (*lèg'èr*) lines, in musical notation M-318
- Leg'horn**, also *Livor'no*, third commercial port in Italy, in Tuscany on w. coast; pop. 130,000; Leghorn straw hats, leather, glass, iron and copper products, anchovies; shipbuilding; map I-156
- Leghorn**, a breed of fowls P-332, *picture* P-337
- Leghorn hats** C-275
- Legion**, originally name given to Roman citizen-army, from Latin *legere*, to gather; in modern times applied to organizations whose members have performed unusual services either civil or military
- American Legion** A-176
- Foreign Legion**, of France A-126
- Roman A-307f**; legionary, *picture* A-305
- Legion of Honor**, French order of merit, reward for civil and military services D-32
- Legion of Merit Medal**, U. S. D-31
- Legislative Assembly**, body in France during Revolution (1791-92) which succeeded National Assembly of 1789-91; F-202
- Louis XVI** deposed L-203
- Legislative Reference Department**, Wisconsin establishes W-125
- Legislature**, the law-making body of a government. *See also* in *Index* Congress; Diet; Parliament
- American colonies** A-154
- bicameral** A-154
- states of U. S.** S-278
- Legitimists**, party in France which after Revolution of 1830 supported elder line of Bourbons; now applied to any supporter of monarchy by hereditary right.
- Legler, Henry Eduard** (1861-1917), American librarian and writer, born Palermo, Italy; came to U. S. in early youth; secretary Wisconsin Library Commission 1904-09; librarian, Chicago Public Library after 1909; L-106g
- Legnano** (*lè-nàn'yò*), Italy, town 16 mi. n.w. of Milan; pop. 27,000; cotton and silk manufactures; Lombard League defeated Frederick Barbarossa near by in 1176.
- Legree**, Simon, in Harriet Beecher Stowe's 'Uncle Tom's Cabin', a brutal slave-driver.
- Legumes** (*lèg'yūm*), pod-bearing plants of pea and bean type, forming family *Fabaceae* or *Leguminosae*
- acacia** A-4
- alfalfa** A-116-18
- bean** B-65-7
- clover** C-261-2
- cowpea** C-386
- lentil** L-98
- nitrogen-fixing bacteria on roots** N-147-8, A-117, C-281
- pea** P-90
- peanut** P-94-5
- soy bean** S-224
- sweet pea** S-341
- tamarind** T-7
- uses: fertilizer** C-367; hay H-249
- Logu'min**, a protein from legumes P-356
- Leguminosae**. *See* in *Index* Legumes
- Lehar** (*lè'här*), Franz (born 1870), Austrian composer, born Hungary; won great popularity with light operas ('The Merry Widow'; 'Gipsy Love'; 'The Yellow Jacket').
- Le Havre** (*lè dv'rè*), French name of Havre (*häv'vèr*), 2d seaport of France, at the mouth of the Seine River; pop. 165,000; H-239
- Lehigh River**, tributary of Delaware River, about 120 mi. long; rises in Pike County, e. Pa.; empties into the Delaware at Easton; navigable by locks for 84 mi.; map P-112
- Lehigh University**, non-sectarian institution for men at Bethlehem, Pa.; founded 1866; colleges of engineering, business administration, and arts and science.
- Lehman** (*lè'màn*), Herbert H. (born 1878), banker and statesman, born New York City; banker 1908-28; lieutenant governor of New York State 1928-32; governor 1932-42; director of Foreign Relief and Rehabilitation, Nov. 1942-Sept. 1943 director UNRRA W-179h
- Lehman Caves**, national monument in Nevada N-22b
- Lehmann** (*lè'màn*), Lilli (1848-1929), German dramatic soprano; because of superb quality and volume of her voice became famous as Brünnhilde, Isolde, and in other Wagnerian roles; also as interpreter of Mozart.
- Lehmann, Liza** (1862-1918), English soprano and composer; remarkable success as concert singer; married Herbert Bedford, composer, 1894, and retired, devoting herself to composition of songs and song cycles ('In a Persian Garden').
- Lehmann, Rosamond** (Mrs. Wogan Philipps), English novelist; achieved distinction in first work 'Dusty Answer', 1927 ('A Note in Music'; 'No More Music'; play).
- Lehmbruck** (*lè'm'brük*), Wilhelm (1881-1919), German sculptor, notable among modernists; by the use of exaggerated lines attained great esthetic and rhythmic force.
- Lei** (*lè'*), a rope of flowers worn by Hawaiians; also used as a token of greeting or farewell; H-240
- Lei**, monetary unit. *See* in *Index* Leu
- Leibnitz** (*lèp'nits*), Gottfried Wilhelm von (1646-1716), German philosopher, mathematician, and scientist; a many-sided genius, versed in law, theology, and politics; spent much of his time at courts of German nobles and took part in affairs of state. Most famous for his contributions to philosophy and mathematics; his differential method in calculus prevailed over Newton's earlier system; founder of Royal Prussian Academy of Science
- controversy with Newton** N-112
- Leicester** (*lè's'tèr*), Robert Dudley, Earl of (1531?-88), English statesman and soldier; his supposed secret marriage to Amy Robsart is the theme of Scott's 'Kenilworth' favorite of Elizabeth E-256

ü=French u, German ü; gom, ðo; thln, thèn; ñ=French nasal (Jean); zh=French j (z in azure); x=German guttural ch

Leicester, Simon de Montfort, Earl of. See in *Index* Montfort, Simon de
Leicester, England, cap. of Leicestershire, on Soar River, 90 mi. n.w. of London; pop. 239,000; hosiery, boots and shoes, lace; Roman remains: map E-270a

Leicester, breed of sheep S-106

Leicestershire, England, n. midland county; 819 sq. mi.; pop. 303,000; agriculture, stock raising.

Leiden (Lē'dēn), Netherlands. See in *Index* Leyden

Leif Ericson, or Ericsson (11th century A.D.), Norse adventurer N-168
Leif Ericson Day (September 29) H-321

Leigh (lē), town in Lancashire, England, 20 mi. n.e. of Liverpool; pop. 47,000; dates from 12th century; silk, cotton, glass, iron.

Leighton (lā'tōn), Frederick, Baron (1890-96), English painter and sculptor, famous for portraits and for paintings of classical subjects P-23, picture G-159 sculptures S-61

Leinster (lēn'stēr), one of 4 provinces of Ireland, in middle and s.e. part; 7580 sq. mi.; pop. 1,220,000.

Leipzig (lēp'zīk), Germany, city in Saxony, 70 mi. n.w. of Dresden; pop. 700,000; great book-publishing center; chemical industries; University of Leipzig: L-93, B-190, map G-66

Leipzig, battle of, or Battle of Breitenfeld (1631) G-190

Leipzig, battle of (1813) N-10

Leipzig, University of, 8d in size and 3d in age of the universities of Germany; established 1409 by 400 teachers and students who seceded from University of Prague as result of Hussite agitations; medicine, law, theology, and philosophy: L-93

Leisler (lē'slē), Jacob (1685?-91), popular leader in colonial N.Y., born Germany; executed for insurrection: N-122

Letsure L-93-93d
activities of the new letsure L-93b-c
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definition L-93c
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Industrial Revolution's influence L-93a-b, photograph I-740

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radio, use of R-31b
sports A-355-7

standards of living affected L-93a-b
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Leith (lēth), Scotland, seaport and shipbuilding center on s. shore of Firth of Forth; port for Edinburgh, with which it was incorporated 1920: map E-270a

Letmotif (lē'mō-tēf), in opera O-228 created by Wagner M-314

Lettrim (lē'trīm), county in Connaught province, Ireland; 589 sq. mi.; pop. 51,000; lost more by emigration than any other county; much of land is poor, but scenery is beautiful, especially along River Shannon; organized as county 1583.

Lejeune, John A. (born 1867), American marine corps officer, born Pointe Coupee Parish, La.; graduated U. S. Naval Academy 1888; commanded marine brigade at capture of Vera Cruz 1914; com-

manded 2d Division A. E. F. 1918-19; took part in battles of Saint-Mihiel, Meuse-Argonne; major general in command of marine corps 1920-29; superintendent Virginia Military Institute 1929-37, superintendent emeritus after 1937.

Le Jeune, Paul (1591-1664), French Jesuit missionary, born Châlons-sur-Marne; 1632-39 was in Quebec as superior of Canadian missions.

Le'land, Charles Godfrey (1824-1903), American poet, ethnologist, traveler, and pioneer educator in art handicraft, born Philadelphia ('Hans Breilmann's Ballads', poems in Pennsylvania Dutch dialect).

Leland Stanford Junior University. See in *Index* Stanford University

Lely (lē'ly), Sir Peter (1617-80), English court painter, born Germany, of Dutch family; famous for portraits of beautiful women of court of Charles II.

Lemaître (lē-mē'trē), Jules (1853-1914), French critic and dramatist ('Impressions of the Theatre' and 'Contemporaries', widely read critical essays; 'The Pardon', 'The Poor Little Thing', plays).

Le'man, Henry and Peter, American, inventors F-50

Leman, Lac. See in *Index* Geneva, Lake

Le Maas (lē māh), commercial and manufacturing town in n.w. France on river Sarthe, 115 mi. s.w. of Paris; pop. 85,000; French under General Chanzy defeated 1871 by Germans under Prince Frederick Charles; again fell to Germans 1940.

Lemare, Edwin Henry (1866-1934), English organist and composer; organist in London; at Carnegie Institute, Pittsburgh; San Francisco; Portland, Me.; Chattanooga, Tenn.; composed organ and choral works, and made transcriptions of orchestral works for organ.

Lemay (lē-mē'), Léon Pamphile (1837-1918), Canadian poet and novelist; educated in theology and law; librarian to Quebec legislature 1867-92 ('Les Vengeances', 'Petits poèmes', 'Les Gouttelettes', 'Reflets d'antan', poetry; 'Le Pèlerin de Sainte Anne', 'L'Affaire Sougraine', fiction).

Lemberg (lēmb'ēr), Poland. See in *Index* Lwow

Lemming, a small rodent of the mouse family, *Miridae*, found in cold regions of Europe and America; dense fur, short tails, and strong claws adapted to digging; Scandinavian lemming inhabits central mountains of Scandinavia and is given to periodic migration: M-166, picture M-165

Lemmon slave case (1854), famous law case in which Chester A. Arthur, later president of U. S., won from highest state courts the decision that a slave who was brought into New York State thereby became free.

Lem'nos, island in n. Aegean; 150 sq. mi.; pop. 4000; held in turn by ancient Greeks, Byzantine Empire, Italians, and Turks; Greek after 1st World War: maps B-18, A-25 fabled home of Hephaestus H-281

Lemon, a citrus fruit L-93d-94 introduced into Europe C-406 producing regions L-93d "sympathetic" ink I-80 vitamin C V-311a waste utilized G-343

Lemon verbena, a perennial plant (*Lippia citriodora*) related to lantana; flowers white or lilac in a 3-spike cluster; leaves lemon-scented, with glandular dots; native to S. America.

Lemon chrome, a pigment formed with chromium compounds C-230

Le Moine (lēm-wōn'), famous family of French-Canadian explorers and soldiers, members of which (father and 7 sons) are better known by territorial titles. See in *Index* Bienville; Iberville

Lemoyne, Jean Baptiste (1704-78), French sculptor S-60

Lempira (lēm-pē'rā), monetary unit of Honduras, worth about 50 cents in U.S. money.

Lemur (lē'mūr), a fox-faced monkey-like animal L-94
altitude range, picture Z-228

Lemuria, hypothetical continent M-17

Le Nain (lē-nān'), Antoine (1598?-1648), Louis (1593-1648), and Mathieu (1607-77), French painters, brothers; depicted interiors and scenes of everyday life of peasants; pictures grayish and dull in color.

Lenape (lēn'ā-pē) Indians. See in *Index* Delaware Indians

Lénard (lē'nār), Philipp von (born 1862), Hungarian physicist; head of radiological institute at Heidelberg 1909; Nobel prize for physics 1905: X-199, 202

Lena River, Siberia, rises in Balkal Mts. in s.; empties into Arctic Ocean, forming vast delta; length 2860 mi.: A-330, S-138, map A-332b

Lenau (lē'nau), Nikolaus (pseudonym of Nikolaus Franz Niembsch von Strehlenau) (1802-50), Austrian poet, born Hungary; intense melancholia gave his lyrics somber, pessimistic tone; died insane ('Faust'; 'Neuere Gedichte'; 'Savonarola'; 'Die Albigenser'; 'Don Juan').

Lenbach (lēn'bāk), Franz von (1836-1904), German portrait painter; called "greatest of his generation"; master of characterization; painted Emperor William I and Bismarck.

Lend-Lease Act (1941) N-75b, R-1460, W-1780, N-12d

Lend-Lease Administration, Office of, U. S. U-232, N-12f, 18, chart N-12r

Lenepveu (lē-nē-vē), Jules Eugène (1819-98), French painter; best known for classical and historical paintings and for decorative frescoes in theaters, churches, etc. ('The Martyrs in the Catacombs')
'Joan of Arc', picture H-369

L'Enfant (lēh-fān'), Pierre Charles, Major (1755-1825), French engineer, who planned Washington, D.C., born Paris; came to fight in American Revolution before Lafayette; served as captain of engineers under Steuben and later was wounded in action at Savannah and captured by British at Charleston. After war, worked as architect in New York City until called (1791) by President Washington to prepare plans for federal capital: W-22 grave U-225

Length, in physics P-191
relativity, in Einstein theory E-212
Length of life. See in *Index* Life, sub-Head length of; Vital Statistics

Lenin (lēn'in), Nikolai (1870-1924), Russian Bolshevik leader L-94, B-170

Leningrad named for L-94
tomb M-264, pictures M-263, R-191
Trotzky and T-144

Leninakan (lēn-ēn'ā-kān), U.S.S.R., formerly Alexandropol or Aleksan-

dropol, city in Armenia, 85 mi. s.w. of Tiflis; pop. 68,000; silk manufactures; Russians routed Turks here 1853; large part of city destroyed by earthquake 1926: *map* E-326e

Leningrad (*l'én'-in-grád*), Russia, formerly St. Petersburg, and Petrograd, chief commercial city of U. S. S. R., former cap. of Russia; pop. 3,195,000: L-94-6, *map* E-326e, *pictures* R-184, 186, 187, museums and art galleries: Hermitage L-95, *picture* R-184, *table* M-392; Russian State Museum, *table* M-393

National Public Library L-106

New Year's custom N-113

Len'ep, Jacob van (1802-68), Dutch poet and novelist, born Amsterdam; wrote patriotic songs and historical romances of which 'De Pleegzoon' (The Adopted Son) is most famous.

Lenni-Lenape Indians. *See in Index* Delaware Indians

Lenoir (*lín-wá'*), Etienne (1822-1900), French inventor of first practical gas engine G-20

Lenoir-Rhyne College, at Hickory, N.C.; Lutheran institution founded 1891; arts and sciences.

Lenormand (*lén-nór-mán'*), Henri-René (born 1882), French dramatist; plays deal with psychoanalytical and often abnormal themes ('The Failures', 'Time Is a Dream', 'Man and His Phantoms').

Lenox, Mass., town in Berkshire Mts., 6 mi. s. of Pittsfield; pop. 2884; noted for picturesque scenery and beautiful country estates.

Lenroot, Katharine Fredrica (born 1891), social worker, born Superior, Wis.; served in Children's Bureau, U.S. Department of Labor, 1915-34, and was appointed chief in 1934.

Lens (*lân's*), France, coal-mining and iron-manufacturing city 135 mi. n.e. of Paris; pop. 33,000; victory of French under Prince of Condé over Spaniards (1648)

in 1st World War A-310

Lens, in optics L-96-8

aberrations (spherical and chromatic) M-158, T-38

anastigmat P-185

apertures in photography P-185

camera P-181, 182, G-105

contact, for eye S-240

diaphragm in camera P-185

eye, human M-349, 352, *diagram* E-349

Fittonia plant F-121

fluorite M-183

focal length P-185

focuses heat H-262

fused quartz, properties Q-3

glass employed G-104-5, T-38

limits of enlargement M-157, T-39

microscope M-156

quartz R-15, Q-3

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spectacles S-240

stereopticon S-285, 286

stereoscopic camera S-288

telephoto P-185, *pictures* P-182

telescopic T-38, 39, 40, G-104-5

toric S-240

Lenski, Lols (born 1893) writer and illustrator of books for children; born Springfield, Ohio; historical backgrounds are based on old records and diaries ('Phebe Fairchild, Her Book', 'A-going to the Westward', 'Round Girl of Cobble Hill', 'Ocean-Born Mary', 'Animals for Me', 'Little Farm').

Lent, in Christian church E-140, H-323

Shrove Tuesday, *picture* H-321

Len'til, a leguminous plant L-98

Lento, direction in music meaning slow.

Lenz's law, of electromagnetic induction E-229

Leo, popes. For complete list *see in Index* Pope, *table*

Leo I, the Great (died 461), pope L-98

Attila and H-362

Leo III (died 816), pope L-98

Leo IV (800?-855), pope L-98

Leo IX (1002-54), pope L-98

Leo X (1475-1521), pope L-98, M-107

Leo XIII (1810-1903), pope L-98

Leo III, the Isaurian, (680?-741) (ruled 717-41), Byzantine emperor; saved empire from Saracens; freed serfs and reduced taxation

campaign against images B-290

Leo, or Llon, a sign of the zodiac Z-218, *charts* S-275e, g

Regulus in S-275a, *charts* S-275c, g

Leofric (*lê-ôf'rik*), earl of Mercia (died 1057), husband of Lady Godiva C-386

Leominster (*lém'-in-stér*), Mass., industrial city on Nashua River, 40 mi. n.w. of Boston; pop. 22,226; plastics, paper, woollens, baby carriages.

León (*lê-ôn'*), Alfonso de (1640?-1700?), Spanish explorer, born in Mexico; governor of Coahuila; led expedition into Texas in 1689 to stop French settlements: T-59

León, Ponce de. *See in Index* Ponce de León

León, Mexico, city 200 mi. n.w. of Mexico City; pop. 70,000; center of agricultural and mining district; cereals, potatoes, fruit, live stock; shoes, soap, textiles: *map* M-133

León, Nicaragua, one of largest and oldest cities in the Republic; founded 1610; former capital; pop. 33,000; in fertile farming district; principal products, corn, sugar cane, cattle and dairy products; university; cathedral built between 1610 and 1780: N-141

León, Spain, ancient kingdom and modern province in n.w.; cap. León (pop. 29,000): *map* S-228

early history S-230

Isabella, queen of I-152

Leonard, William Ellery (born 1876), American poet and educator, born Plainfield, N. J.; professor of English, University of Wisconsin; noted for poems of sharp beauty showing great depth of feeling ('Two Lives', 'A Son of Earth', poems; 'The Locomotive God', autobiography).

Leonardo da Vinci. *See in Index* Vinci, Leonardo da

Leoncavallo (*lê-ôn-kâ-vâl'lo*), Ruggero (1858-1919), Italian composer, born Naples; in early years strongly influenced by Wagner; best known for opera 'Pagliacci'; other operas include 'La Bohème', 'Zaza', 'Chatterton', 'Der Roland von Berlin'; wrote own librettos; also composed symphonic poem story of 'I Pagliacci' O-232

Leonidas (*lê-ôn'-i-dâs*), king of Sparta, killed 480 B.C. at Thermopylae P-136

Le'onids, meteor group M-126, 128

Leonof (*lê-ôn'ôf*), Leonid Makimovich (born 1899), Russian novelist ('The Badgers', 'Sot') place in Russian literature R-197

Leontes (*lê-ôn'tês*), in Shakespeare's 'A Winter's Tale', king of Sicily W-118

Leopard (*lêp'ard*), animal of the cat family L-98-9

cat family characteristics C-95-6

method of capturing Z-219

'Leopard', British warship W-8

Leopard cat, or ocelot (*ô'sê-lôt*) L-98a

cat family characteristics C-95-6

Leopard frog F-207-8

Leopardi (*lê-ô-pâr'dê*), Giacomo, Count (1798-1837), Italian lyric poet, prose writer, and scholar, master of finished style and slave of pessimism; 'La Ginestra' gives full expression to his creed.

Leopards-bane. *See in Index* Doronicum

Leopard seal, or harbor seal S-68, 70

Leopold I (1840-1705), Holy Roman emperor, elected 1658; defeated Turks and French; subdued Hungarian revolt and made Hungarian crown hereditary.

Leopold II (1747-92), emperor, elected 1790; son of Maria Theresa and brother of Marie Antoinette; died before events of French Revolution called for intervention he had prepared.

Leopold I (1157-94), duke of Austria, succeeded 1177; went on Crusades 1182 and 1190; quarreled with Richard I in Palestine

imprisons Richard I R-104

Leopold I (1790-1865), king of the Belgians, German prince, uncle of Queen Victoria of England; elected 1831; called "Nestor of Europe."

Leopold II (1835-1909), king of the Belgians; succeeded 1865; notorious profligate but able ruler: B-90

develops Congo State C-331, S-270

rival claims in Africa A-42

Leopold III (born 1901), king of the Belgians, son of Albert I; succeeded 1934; modest and democratic ruler, but unequal to political and military problems facing his country after rise of Hitler; surrendered Belgium to Germans after brief resistance May 28, 1940.

Leopold, Order of, Belgian military decoration D-32

Leopold II, Lake, in Congo State, *map* C-331

Leopoldville, cap. of Congo State; on Congo River, near Stanley Pool; pop. 43,000; terminal of Matadi-Leopoldville Railroad; radio station: *map* A-42a

Lepachys (*lêp'-â-kis*), annual or perennial plants of the composite family, native to N. America. Grow 2 to 5 ft.; leaves finely cut; flowers solitary, on wiry stems, ray florets, 6 or 7, yellow or purple, droop from the cylindrical thimble-like center of disk florets that are first silver gray, later brown; variously named cone-flower, yellow, gray-headed, or long-headed cone-flower.

Lepanto (*lê-pân'tô*), battle of (1571), fought in Gulf of Corinth near Lepanto, Greece T-163

Cervantes at C-135

galleys N-56d

Lep'idolite, a mineral M-184

Lepidoptera, the order of scaly-winged insects including butterflies, moths, and skippers B-282

Lep'idus, Marcus Aemilius (died 13 B.C.), wealthy Roman, triumvir with Antony and Octavian (Augustus) A-364

Leporidae (*lê-pôr'-i-dê*), a family of rodents including the hares and rabbits.

Leprechawn (*lêp-rê-kân'*) or leprachawn, in Irish superstition a pigmy sprite sometimes inhabiting wine-cellar, sometimes farmhouses, and aiding in work; possesses treasure which a human being may obtain by keeping his eye fixed on the sprite.

Lep'rosy, a chronic disease of the skin and nerves. Its cause, the leprosy bacillus, was discovered by G. H. Hansen of Norway. Leprosy is most effectively treated by injections of chaulmoogra oil or hydnocarpus oil or their derivatives. It is estimated that there are more than 3,000,000 lepers in the world. Colonies for the segregation and treatment of lepers are maintained by the U. S. on the island of Molokai and at Kalihl, Oahu, in Hawaii; on three islands in the Philippines: Culión, Cebu, and Legaspi; at Balboa, Canal Zone; at St. Croix, Virgin Islands; on an island in the harbor of San Juan, Puerto Rico; and at Carville, La. Molokai colony H-243. Philippine Islands P-167.

Lep'tis Mag'na, or Ma'ior, ancient seaport in Libya, 100 mi. e. of Tripoli; founded by Phoenicians; became splendid Roman city; birthplace of Emperor Septimius Severus; ruins of harbor, beautiful sculptures, and buildings have been uncovered: L-121b, pictures L-121a, A-252.

Leptocephalus (lěp-tō-sěf'ŭ-līs), larva of eels B-191.

Lepton (lěp'tōn) (plural lepta), a minor coin of ancient times, worth about 1/10 cent; Jerusalem lepton famed in Bible as "widow's mite"; also a modern bronze Greek coin worth 1/100 drachma.

Lepus, or Hare, a constellation, chart S-275f.

Le Puy (lū pūē), France, town 140 mi. n.w. of Marseilles; pop. 22,000; 12th-century cathedral; famous in Middle Ages; lace, textiles, chocolate, spirits.

Lerida (lě-rē-dā), Spain, walled cathedral city 80 mi. w. of Barcelona; pop. 43,000; leather, glass, textiles; as Celtiberian *Ilerda* heroically resisted Romans.

Lérins (lě-rān's), monastery of, on island of Lérins in Mediterranean 3 mi. from Cannes, France M-233.

Lerma (lěrmā) River, or Santiago (sān-tō-ā'gō) River, Mexico, rises 18 miles west of the city of Mexico, flows through Lake Chapala into Pacific Ocean near Guadalajara; at Juanacatlan it forms a fall 50 ft. high and 430 ft. wide; generally called Santiago in lower course; 457 mi. long.

Lermontov (lěrmōn-tōf), Mikhail Yurievitch (1814-41), Russian poet and novelist; ranked next to Pushkin as greatest Russian poet; despised society; felt at home only in Caucasus ('On the Death of a Poet', 'Song of the Merchant Kalashnikov', poems; 'The Hero of Our Time', first Russian psychological novel).

Lerolle (lū-rōl'), Henri (1848-1929), French painter known especially for large landscapes with few figures and realistic portrayal of evening light ('At the Organ', 'In the Country').

Lerwick, capital and chief town of Shetland Islands, Scotland, on s.e. coast of Mainland Island.

Le Sage (lū sōch'), Alain René (1668-1747), French novelist and dramatist, author of a hundred plays; a satiric realist ('Gil Blas', comic masterpiece of adventurous roguery).

Les Baux (lā bō), or Beaux, a village in s. of France, near Arles; gives name to bauxite ore.

Lesbos, a Greek island in the Aegean Sea off coast of Asia Minor; 675

sq. mi.; pop. 205,000; famous for school of poets that flourished there in 7th century B.C., and as the birthplace of the poetess Sappho; name of cap. Mytilene, or Mytilini, also given to whole island; maps G-154, B-326c.

Lescauze (lěs'ōaz), William (born 1898), American architect, born Geneva, Switzerland; came to U. S. 1920; leader in modernism; functionalist; regular-lined style.

Les Chêneaux (lā shē-nō'), islands in Lake Huron M-153.

Leschetitsky (lěs-chē-tits'kē), Theodor (1830-1915), Polish pianist and composer; teacher of Paderewski.

'Les Misérables' (lā mē-sā-rā'bēl), novel by Victor Hugo H-353-4.

Lospedezza (lēs-pē-dē-zā), a plant C-282.

Lospinasse (lēs-pl-nās'), Julie Jeanne Eléonore de (1732-78), French letter-writer and social leader, noted particularly for her love-letters: C-347b.

Lesseps (lū-sēps'), Ferdinand, Viscount de (1805-94), French engineer, born Versailles; served as consul at Cairo, Rotterdam, and Barcelona.

builds Suez Canal S-317, 318. Panama disaster P-44.

Lesser ant-eater, picture A-218.

Lesser Antilles, eastern islands of West Indies W-72, map W-72b.

Lesser Slave Lake, in central Alberta, Canada; about 475 sq. mi.: map C-50b.

Lessing, Gotthold Ephraim (1729-81), German critic and dramatist; helped free German literature from French influence; famous for 'Laokoon', a critical work on poetry and plastic arts that had great influence ('Minna von Barnhelm', perennially popular comedy; 'Emilia Galotti', tragedy; 'Nathan the Wise', noble poetic drama of religious tolerance).

Lesueur (lū-sū-ār'), Charles Alexandro (1778-1846), French zoologist and artist; did earliest American work on marine invertebrates and fishes of Great Lakes; called 'Raphael of zoological painters'; with Owen's colony at New Harmony, Ind.

Le Sueur (lū sū-ār'), Pierre Charles, Canadian explorer and trader; drowned at sea on voyage to France: M-194.

'L'état, c'est moi' (lā-tā sē mwā) L-201.

Leth'bridge, Alberta, city 115 mi. s.e. of Calgary on Oldman (Belly) River; pop. 18,523; distributing point for coal, lumber, farm products; various manufactures; district headquarters for Royal Canadian Mounted Police: map C-50b.

Lethe (lě-thē), in Greek mythology, river of oblivion H-194.

Le'to, in Greek mythology, mother of Apollo and Artemis. Niobe and N-146.

Lettering, in drawing D-102.

Letter of credit C-393-4.

Letters of marque, commissions authorizing private persons to fit out armed vessels P-222.

Letters of the alphabet. See in Index Alphabet; also story heading each letter section of the Index.

Letter writing L-98a-99.

ancient L-98a; Tel-el-Amarna letters B-210, L-98a.

business letters L-98a-99.

literature in letters L-98a, 99; Mme. de Sevigne's letters S-85.

social letters L-98a-c.

'Letting Out the Doves', game P-252, picture P-253.

Letts, people of Latvia L-71.

Lettuce, plant of the chicory family commonly used for salads. how to plant G-13.

Letvia. See in Index Latvia.

Leu (lē'g), plural lei (lē'ē), the monetary unit of Rumania, worth nominally about 1 cent in U.S. money and divided into 100 bani; formerly worth 19.3 cents.

Leucomia (lū-sē-mī-d) B-158.

Leucite (lū'sit), a rock-forming mineral of potassium and aluminum metasilicate, found in basaltic lavas, and sometimes used in crude form as fertilizer: M-184.

Leucocytes (lū'kō-sils), white blood corpuscles B-157, 157a, 157b-58.

Leucocytosis B-158.

Leuctra (lū'ktrā), battle of (371 B.C.) named for village of Leuctra in Boeotia T-78, picture T-77.

Leuthen (lū'tēn), Germany, village in Lower Silesia, 9 mi. w. of Breslau; scene of Seven Years' War battle (1757) in which Frederick the Great defeated the Austrians.

Leutze (lū'tsū), Emanuel (1816-88), American painter of historical subjects, born Germany P-27.

Hudson River School P-27.

Leuven, Belgium. See Louvain.

Lev (lēv) (plural leva), the monetary unit of Bulgaria since 1928, nominally worth less than 1 cent in U.S. money; formerly equal to gold franc, worth 19.3 cents.

Levant (lē-vānt'), term meaning 'rising (of the sun)' applied to the countries bordering the eastern Mediterranean.

Levantine Sea M-110.

Levee, an embankment R-110, F-106b-o. See also in Index Dike.

asphalt mattress, picture F-106c.

jetties J-214, G-3.

Mississippi River M-204, 206, N-101, F-106b-o.

natural formation P-201, F-108c, diagram F-106b.

shortcomings F-108c.

Level, a tool T-112, S-332.

'Levelers', political faction in Furlan Civil War C-401.

Le'ver, Charles James (1806-72), Irish novelist, a born story-teller, with inexhaustible fund of boisterous good humor; wrote of everyday people and of army life ('Charles O'Malley', 'Harry Lorrequer').

Lever, a mechanical device M-103.

104, P-192.

Archimedes discovers principle

M-104, A-255.

in weighing machines W-85.

Leverhulme, William Hesketh Lever, first Viscount (1851-1925), English business man; established huge soap works (Lever Brothers) with associated companies all over world; model industrial village at Port Sunlight near Liverpool; instituted profit-sharing plans.

Leverrier (lū-vēr-ē-yā), Urbain J. J. (1811-77), French astronomer; discoverer of Neptune: A-349-50.

Le'vi, Hebrew patriarch, 3d son of Jacob and Leah, ancestor of tribe of Levi or Levites.

Leviathan (lē-vī-ā-thān), Hebrew name for sea monster; loosely applied to any huge sea animal.

'Leviathan', an ocean liner; before first World War was German liner *Vaterland*; acquired by United States; scrapped 1937.

Levinson, Salmon Oliver (1865-1941), American lawyer and advocate of peace, born Noblesville, Ind.; admitted to bar 1891, and practised in

- Chicago, specializing in reorganizing industries and railroads; leader of movement for outlawry of war; author of plan for readjustment of German reparations, allied debts, and world peace (1927).
- Lévis** (*lā-vē*'), Quebec, important port and strongly fortified old town on St. Lawrence River opposite Quebec (city); pop. 11,724; large graving dock and shipyard; lumber, machinery, cigars.
- Levites**, tribe of Israelites J-216
- Leviticus**, the 3d book of the Old Testament, containing the ceremonial laws of the priests.
- Levulo-rotation** (*lāv-yu-lō*), or laevo-rotation, of polarized light, rotation of plane-polarized light to the left L-131
- tartaric acid exhibits T-14
- Levulose**, a form or fructose S-322. See also in *Index Fructose*
- Lewes** (*lū-ēs*), George Henry (1817-78), English philosopher and critic; founded and edited *Fortnightly Review*
- George Eliot and E-253-4
- Lewes** (*lū-ēs*), Del., resort city on Delaware Bay; pop. 2246; founded 1631 by Dutch as Fort Opdike, first settlement in Delaware; scene of first and last naval battles of Revolution, and other historic events: D-40d, map D-40
- Lewes**, England, county seat, East Sussex, 45 mi. s. of London; pop. 11,000
- battle of (1264) M-248
- Lewes River**, the upper course of the Yukon Y-214
- Lewis**, Andrew (1720?-81), American soldier, born Ireland; major in Washington's Virginia regiment; brigadier general Continental army victory of Point Pleasant V-308
- Lewis**, Charles (died 1774), American pioneer soldier in Virginia; brother of Gen. Andrew Lewis
- death V-308
- Lewis**, Charles (1786-1836), English bookbinder B-183
- Lewis**, D. B. Wyndham (born 1894), English author; of an old Welsh family; columnist on London *Daily Express*; contributor *Daily Mail*; his studies and writings chiefly concerned with Middle Ages ('*Frangols Villon*'; '*King Spider*'—a life of Louis XI of France).
- Lewis**, Elizabeth Foreman (born 1892), writer, born Baltimore, Md.; missionary teacher in China; Newbery medal (1933) for first book '*Young Fu of the Upper Yangtze*' ('*Homing, Girl of New China*'; '*Portraits from a Chinese Scroll*').
- Lewis**, Francis (1718-1803), signer of Declaration of Independence as N. Y. delegate; born Wales; a founder of "*Sons of Liberty*."
- Lewis**, Gilbert Newton (born 1876), chemist, born Weymouth, Mass.; taught chemistry at Harvard, Mass. Institute of Technology, and (after 1912) University of California; proposed (1916) his theory of atomic structure: A-361, diagram A-360
- Lewis**, Isaac N., Colonel (1858-1981), U. S. Army officer, born New Salem, Pa.; inventor of machine gun: M-6
- Lewis**, John (about 1678-1745), American pioneer, born in Ireland; first white settler of Augusta County, Va.
- Lewis**, John Llewellyn (born 1880), labor leader, born Lucas, Iowa; began working in Lucas coal mines at age of 12; later worked in copper mines in Colorado, silver and coal mines in Montana, Wyoming; president United Mine Workers of America after 1920; chairman Committee for Industrial Organization (C.I.O.) 1935-38; made president of C.I.O. 1938 when name was changed to Congress of Industrial Organizations; resigned 1940 after failure of his campaign against reelection of Franklin D. Roosevelt: L-44a, R-146k, N-12r
- Lewis**, Matthew Gregory (1775-1818), English romance writer and dramatist, nicknamed "*Monk*" after his most popular romance '*Ambrosio*, or the *Monk*' which was suppressed and later reprinted in expurgated form.
- Lewis**, Meriwether (1774-1809), American explorer, born near Charlottesville, Va.; captain U. S. Army and private secretary to Jefferson until sent by him on famous expedition: L-99-100
- national monument N-22b
- Lewis**, Paul, inventor of spinning frame with John Wyatt L-74c
- Lewis**, Sinelahr (born 1885), American novelist, born Sauk Center, Minn.; writes penetratingly and satirically of American people and customs; awarded Nobel prize in literature 1930 ('*Main Street*'; '*Arrowsmith*'; '*Dodsworth*'; '*It Can't Happen Here*'; '*Prodigal Parents*'): A-181, picture A-182
- Lewis**, William B. (1784-1866), friend, adviser, and campaign manager of Andrew Jackson and member of famous "*Kitchen Cabinet*."
- Lewis**, Wyndham (born 1884) English author and artist, born in state of Maine; brought up in England (not related to D. B. Wyndham Lewis, see above); leader of vortical painters ('*Tarr*', novel; '*Time and the Western Man*', philosophy).
- Lewis** and Clark Centennial Exposition, also called American Pacific Exposition, held June 1 to Oct. 15, 1905, in Portland, Ore., to celebrate 100th anniversary of exploration of the Oregon country; cost about \$7,000,000; attendance 2,545,609.
- Lewis** and Clark Expedition (1804-06) L-99-100, map U-242
- Idaho I-9
- Lewis** Carroll (1832-98), pen name of Charles L. Dodgson, English mathematician and author C-87
- Lewis** Institute. See in *Index* Illinois
- Institute of Technology
- Lew'site**, a poison gas G-25
- Lewis** machine gun M-6
- Lewisohn**, Ludwig (born 1882), American-Jewish writer, born Berlin; autobiographical books show his attempted complete assimilation in Nordic civilization, his disappointment, and return to identification with Judaism ('*Upstream*'; '*Israel*'; '*Midchannel*').
- Lewisohn** Stadium, in New York City, picture N-132
- Lewiston**, Idaho, city on Snake and Clearwater rivers, 90 mi. s.e. of Spokane, Wash.; pop. 10,548; mining, lumber, wheat, live stock, and fruit interests; state normal school: map I-8
- Lewiston**, Me., textile manufacturing city on Androscoggin River opposite Auburn, 80 mi. n. of Portland; pop. 88,598; Bates College: M-39, map M-38
- Lewistown**, Ill., town 48 mi. n.w. of Springfield; pop. 2355
- ancient mound, picture A-149
- Lewistown**, Mont., city in center of state in farming, stock-raising, oil,
- and mining district (gold, coal, silver, gypsum); pop. 5874: map M-243
- Lewistown**, Pa., borough on Juniata River 42 mi. n.w. of Harrisburg; pop. 13,017; iron and steel products, artificial silk, hosiery, flour, dairy products, silica brick.
- Lewis-with-Harris Island**, in Hebrides H-267
- Lex Canuleia**, Roman law R-131
- Lex Hortensia**, Roman law R-132
- Lexington**, Ky., wholesale and manufacturing center 73 mi. s. of Cincinnati, Ohio, in bluegrass region; pop. 49,304; tobacco market; state university, Transylvania College, Hamilton College, and College of the Bible: K-12, map K-11
- Lexington**, Mass., town 11 mi. n.w. of Boston; pop. 13,187; scene of first battle of Revolution (Lexington and Concord): L-100
- first state normal school E-178
- Lexington**, N. C., city 20 mi. s. of Winston-Salem; pop. 10,550; settled in 1775; flour and cotton mills.
- Lexington**, Va., in farming district 80 mi. n.w. of Lynchburg; pop. 3914; Washington and Lee University, Virginia Military Institute; burial place of Stonewall Jackson and Robert E. Lee: map V-306, pictures V-308b
- Lexington** and Concord, battle of L-100, pictures M-85, R-87
- Paul Revere's ride R-81
- Lex Valeria**, Roman law R-130-1
- Leyden** (*lū-dēn*), Lucas van (1494-1533), Dutch engraver N-71
- Leyden**, Netherlands, also Lelden, famous old city on Old Rhine, 22 mi. s.w. of Amsterdam; pop. 70,000; birthplace of Rembrandt: map E-87
- Dutch home of Pilgrims M-92
- story, '*How the Ocean Saved Leyden from the Spaniards*' N-73-4
- university U-260; library, chained books, picture L-104
- Leyden jar**, an electrical condenser E-231
- oscillating discharge R-15
- Leyendecker**, Joseph Christian (born 1874), painter, born Montabaur, Germany; studied in U.S. and France; noted for magazine cover work.
- Lhasa** (*lā'sā*), or *Lassa*, capital of Tibet in s.; pop. about 50,000: T-90, map A-332c, picture T-90
- Lhasa** torrier D-82
- Lhevinne**, Joseph (born 1874), Russian pianist; debut in America 1906 with Russian symphony orchestra; taught music in Berlin, later in New York.
- Liabilities**, of banks B-39, 40
- Liakoura** (*līā'kō-rā*), modern name for Mt. Parnassus.
- Liao-ho** (*lā-ou-hō*'), river of Manchuria; rises in Great Khingan Mts., flows e. along Hopeh border, then s. to Gulf of Liaotung: M-50, map M-49a
- Liaotung** (*lā-ou-tung*) Peninsula, Manchuria, projects s.w. into Yellow Sea between gulfs of Liaotung and Korea; Port Arthur at tip: C-221k, l, map M-49a
- Russo-Japanese War R-198
- Liaoyang** (*lā-ou-yāng*'), city in Manchuria on railroad from Mukden to Port Arthur; pop. about 100,000; captured by Japanese (1904) in Russo-Japanese War.
- Liard River**, Canada, second largest tributary of the Mackenzie River; rises in s. Yukon Territory and flows through n. British Columbia in a n.e. direction; enters the

ü=French u, German ü; gem, gō; thin, #ken; ñ=French nasal (Jean); zh=French j (z in azure); x=German guttural ch

Mackenzie at Fort Simpson, about 160 mi. west of Great Slave Lake: map C-50b

Classic (*kl'as'ik*) period, in geology, picture G-41

Liniris (*li'n'ris*), or blazing star, a genus of perennial plants of the composite family, native to N. America. Tall wandlike flower spikes, purple or white, rise from clusters of narrow, ribbed leaves. Some species used in medicine. Also called gayfeather and button snakeroot.

Libra (*li'bu*), Latvia. See in Index *Libija*

Libby Prison, notorious Confederate prison at Richmond, Va., hastily established in Libby and Son's tobacco warehouse during Civil War; removed 1892 to World's Fair at Chicago; site now marked by tablet.

Libel, in law, a false defamation expressed in writing, printing, or picture, which injures the character or reputation of anyone and exposes him to public ridicule or contempt; distinguished from slander.

Liberal arts
college of U-257, C-302
medieval universities U-260

Liberal party (Canada), C-60, 62
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Liberal party (Great Britain) P-291
Gladstone G-98-99
Irish question P-81-2, G-98, I-128
Lloyd George L-173-5
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social legislation and reforms B-275-6

Liberal Republican party (U. S.), formed 1872 by Republicans opposed to political abuses under Grant; nominated candidates 1872 and 1870
Horace Greeley G-175
Sohrur a leader H-261

Liberal Unionist party (Great Britain) P-291, C-137a

'Liberator', abolitionist paper G-16

'Liberator', title given Simon Bolivar B-167-8

Liberia, Negro republic on w. coast of Africa; 43,000 sq. mi.; pop. 2,000,000; cap. Monrovia: L-100-1, map A-42a
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rubber plantations L-101, R-165

Liberty. See also in Index Freedom of speech; Freedom of the press; Religious liberty
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Napoleon F-204
Paine P-12

'Liberty, Equality, and Fraternity' R-160, F-200

'Liberty, Equality, and Humanity' M-94

'Liberty', sloop belonging to John Hancock H-206

Liberty, Statue of, in New York harbor L-101, B-52, N-123; pictures L-101, N-124
national monument N-22d

Liberty Bell D-29, picture D-28

Liberty bonds (U. S.), in 1st World War W-170
selling campaign, picture W-169
teach thrift T-87

Liberty cap, symbol of freedom which appears on Goddess of Liberty and on many coins and coats of arms; a conical, close-fitting cap, with top drooping forward. It was worn by ancient Phrygians and was placed by Greeks and Romans upon head of a freed slave; as *bonnet rouge*

or red cap became famous during French Revolution.

Liberty Island. See in Index Bedloe's Island

Liberty party (U. S.) C-249

Liberty Tree Flag (1776) F-99, color plate F-90

Libia (*li'b'i-d*). See in Index Libya

Li'bra, a sign of the zodiac Z-216, charts S-275d

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Chicago Public L-106b, picture L-106b
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Library Association, American. See in Index American Library Association

Library of Congress, Washington, D.C. L-106j-k, W-24-5, pictures L-102, 100k, G-124, U-219, W-25
murals: by Cox C-367; by Vedder, picture G-124

Libretto, in music, the text or words of an opera or other composition.

Libreville, capital of the colony of Gabon, in French Equatorial Africa; pop. 20,000; important seaport on Gulf of Guinea; founded by the French 1849: map A-42a

Libya (*li'b'i-d*), also **Libia**, Italian colony in n. Africa; 680,000 sq. mi.; pop. about 900,000: L-121a-b, maps A-42a, b. See also in Index Tripoli
2d World War W-176p-r, W-179b

Libyan Desert, part of the Sahara in Egypt and Libya extending from the Mediterranean to the Sudan L-121a, maps A-42a, b
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Lice. See in Index Louse

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form of taxation T-17
radio operators R-28
radio stations R-26, 31
ship's officers S-126

Licensing Act (1637) P-348

Lichee. See in Index Litchi

Lichens (*li'kenz*), "partnership" plants composed of algae within fungi L-122, P-70
agents in soil formation S-191b, L-122
lignin made from L-165

Lichfield, England, city in Staffordshire, 118 mi. n.w. of London; pop. 9000
cathedral E-280

Licinian laws, six laws of ancient Rome passed 367 B.C. in tribuneship of Gaius Licinius; practically ended the struggle between patricians and plebeians: R-132

Licinian, Flavius Galerius Valerius (250?-224), Roman emperor, 307-323 A.D.; defeated Maximinus and became sole ruler in East; married Constantine's half-sister; executed for treason: C-346

Lick, James (1796-1876), American philanthropist, born Fredericksburg, Pa.; established Lick Observatory; buried in vault under the large telescope there.

Licking River, rises in Cumberland Mts. in e. Ky., and flows n.w. 220 mi. to Ohio River: map K-11

Lick Observatory, California O-194

Licorice (*li'k'is*), or liquorice, a plant L-123

Lictor (*li'k'tor*), official attendant of magistrates in Rome; a dictator had 24 lictors; a consul 12, a praetor 6, a praetor, 2. They executed orders, inflicted punishment on offenders; carried fasces.

Liddell, Henry George (1811-98), dean of Christ Church College, Oxford 1855-91; with R. A. Scott prepared 'Greek Lexicon' (1848), still used. His daughter Alice was original of 'Alice in Wonderland'.

Lido (*li'do*), Venice V-276

Lie (lě), Jonas (1833-1908), Norwegian novelist, friend of Ibsen and Björnson; a realist whose keen insight into character is softened by humor and sympathy, particularly when he writes of the sailors among whom he grew up ('The Visionary'; 'The Commodore's Daughter'; 'Niobe'; 'Dyre Rein'; 'The Pilot and His Wife').

Lie, Jonas (1880-1940), American landscape painter, born Norway, nephew of the above; painted especially, vistas of city streets and scenes of the natural beauties of the country ('Brooklyn Bridge'; 'Silver Morn'; 'The Ice Harvest'); P-20

Liebermann (lě'bēr-mīn), Max (1847-1935), German painter, born Berlin; studied at Weimar, Paris, and Munich; an important exponent of Impressionist school in Germany; president Prussian Academy of the Arts ('Amsterdam Orphan Girl'; 'Jesus Among the Scribes'; 'The Spinners'); also landscapes and portraits.

Liebig (lě'bīk), Justus von, Baron (1803-73), German chemist and teacher; established first laboratory course for teaching chemistry; proved that "organic" substances are subject to same chemical laws as inorganic ones and synthesized many organic compounds; proved animal heat the product of combustion of food; his studies of plant chemistry and fertilizers founded agricultural chemistry.

Liebknecht (lě'knēkt), Karl (1871-1919), German Socialist leader; son of Wilhelm Liebknecht, friend of Marx and Engels; only member of Reichstag to oppose World War; shot by soldiers while on his way to prison after Spartacan uprising "Spartacans" S-240

Liechtenstein (lě'čtēn-shīn), principality of Europe on upper Rhine; borders Switzerland s. of Lake Constance; formerly practically Austrian dependency, but absolutely independent after 1918; capital Vaduz; area 65 sq. mi.; pop. 12,000; has had no army since 1868; cattle, corn, wine, fruit, timber; map E-323d

flag F-95, color plate F-89

Lie detector, any of several devices which are designed to reveal the changes in heart, pulse, or nerve rhythm of a person deliberately making a false statement.

Liège (lě-dēh'), chief manufacturing city of Belgium; pop. 167,000 (with suburbs, 255,000); L-123, map B-87 Charles the Bold takes C-153

siege of (1914) L-123, W-154, A-320

Liegnitz (lě'gnits), Germany, manufacturing and trade town in Prussian province of Silesia, 40 mi. n.w. of Breslau; pop. 77,000; decisive victory of Frederick the Great over Austrians (1760); map G-68

Lien, in law C-394

Liepāja, Latvia, also Libau, Baltic port, railroad terminus, and manufacturing city; pop. 65,000; ice-free artificial harbor; large export trade; metal-working; shelled by German fleet in 1st World War.

Lieutenant (lě-tēn'ānt), in U. S. Army, commissioned officer next in rank below a captain; there are first and second lieutenants

insignia, picture U-178

Lieutenant, in U. S. Navy, commissioned officer next in rank below a lieutenant commander N-58c

insignia, picture U-179

Lieutenant colonel, in U. S. Army, commissioned officer ranking next below a colonel

insignia, picture U-178

Lieutenant commander, in U. S. Navy, a commissioned officer ranking between a commander and a lieutenant N-58c

insignia, picture U-179

Lieutenant general, in U. S. Army, an officer next below a general

insignia, picture U-178

Lieutenant governor, an officer authorized to perform the duties of a governor during his absence or to take his place in case of death or resignation

Canada C-64

Life. See also in Index Animals; Biochemistry; Biology; Cell; Evolution; Man; Plants; Protoplasm; Reproduction

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P-358, B-109-10

possibility on: moon M-250, 252, 253;

planets B-112, 114, P-231

Life-boat L-123

Life-buoy, or life-preserver, a float which will support one or more persons in water; usually made of cork, balsa, or kapok

breeches-buoy L-123

kapok K-7

Life community, in ecology E-145b, g

Life environment. See Ecology

Life Guards (England), picture L-184

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Coast Guard C-289-90, picture U-232:

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Life zones, or zoogeographical regions, Outline Z-230

Lifey (lī'fī) River, Ireland, 70-mile long stream rising s. of Dublin and flowing w. and n. in a semi-circle into Dublin Bay

at Dublin D-115

Ligament (from Latin *ligare*, to

bind), a tough, fibrous band which

connects bones or supports viscera

S-155

Ligan. See in Index Flotsam

Liggett, Hunter (1857-1935), major general U. S. Army; born Reading, Pa.; served in Cuban and Philippine campaigns; lieutenant general, commanded First Army, A. E. F.; commander at Argonne and Saint-Mihiel; retired in 1921 ('Commanding an American Army'; 'Recollections of the World War').

Light L-125-31, Outline P-197. See also in Index Electric lighting; Gas, for heating and lighting; Lamps; Lighting; and principal topics listed below

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'Light Brigade, Charge of the' C-398.

See also in Index 'Charge of the

Light Brigade'

ü=French u, German ü; œm, jo; thin, then; ð=French nasal (Jeau); sh=French j (s in azure); x=German guttural ch

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cerium used C-176, M-183
Lighter-than-air craft. *See in Index*
Airship; Balloon
Light Horse Harry. *See in Index* Lee, Henry
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stroboscopic light C-134
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Lightning camera L-135
Lightning rod, for protecting buildings from lightning L-135
invented by Franklin D-231
Lightning war, or Blitzkrieg W-178d
'Light of Asia', poem by Sir Edwin Arnold telling of life and teachings of Buddha.
Lightship L-132, 134
Light soil S-191a
'Light That Failed, The', a story by Kipling of an artist-journalist who becomes blind K-24a
Light therapy, also called phototherapy and heliotherapy, treatment of disease with natural or artificial light rays R-15. *See also in Index*
Ultra-violet rays
mercury-vapor lamps R-15, Q-3, *picture* H-371
quartz transmits ultra-violet rays G-104
Light-year, distance traveled by light in a year A-346, S-273
Lignin, or lignone, complex chemical substance which, with cellulose, forms the woody structure of plants and trees; used as basis of certain

new plastics. In making paper from wood pulp the lignin is removed by-product uses P-61
Lignite (*lig'nī*), fuel midway between coal and peat C-284
carbon cycle, *photograph* P-238a
Germany G-69
United States deposits U-194; North Dakota N-161-2; South Dakota S-219; Texas T-54
Lignocellulose, cellulose from wood masonite made from P-245c
Lignumvitae (*lig'nūm-vī-tē*), a tropical tree of the genus *Guaicum* of the catrop family, native to s. Florida, Central and South America. Grows to 80 ft.; leaves oblong, leathery; flowers blue, rarely white. Wood extremely hard, fibers much interwoven, heavy, contains a gum-resin that acts as a natural lubricant. Used for propeller-shaft bearings of ships and other bearing parts permanently under water, pulleys, and mallet heads. Guaiac gum or resin collected from living tree is used in medicine.
Ligny (*lèn-yē*), village in Belgium 25 mi. s.e. of Brussels; victory of Napoleon over Prussians under Blücher (1815) prelude to battle of Waterloo W-46
Liguest, Pierre Laclede. *See in Index* Laclede, Pierre
Ligugé, monastery of M-233
Liguria (*li-gū'ri-ā*), in ancient Roman days, the part of n. Italy between the Po and the Mediterranean, and from the Gulf of Genoa to the Gaul border, or even at one time to the Rhone; also district of modern Italy; 2097 sq. mi.; pop. 1,400,000
Industries I-161
Ligurian Republic, name given to the democratic government instituted in Genoa 1797 by Napoleon I; incorporated in France 1805.
Ligurians, a pre-Roman and pre-Tuscan people, organized in tribes, considered by some authorities the aboriginal inhabitants of n. Italy in France F-171
Ligurian Sea. *See in Index* Genoa, Gulf of
Li Hung-chang (*lī hūng chāng*'), (1823-1901), Chinese statesman; aided by Gordon's army, suppressed Taiping rebellion; bore chief burden of Sino-Japanese War of 1894; for many years "buffer" between China and outside world.
Likin, a tax in China C-221b
Lilac, a shrub of the olive family L-136
hedges H-270, G-9
Liliaceae (*lī-lī-ā-sē-ē*), the lily family of plants.
Lil'encron (*lī-lēn-kron*), Detlev, Baron von (1844-1909), German soldier, lyric poet, and realistic novelist ('Adjutantenritte', poems; 'Poggfried', humorous epic; 'Unter flatternden Fahnen', 'Krieg und Frieden', short stories); G-63
Lilienthal (*lī-lēn-tāl*), Otto (1848-98), German inventor; one of the early experimenters in aviation; attempted to imitate flight of birds gliders A-66, *picture* A-66
Lilith (*lī-līth* or *lī-līth*), in Hebrew folk-lore, a demon in the form of a beautiful woman who works mischief at night, especially among children; said to have been the first wife of Adam.
Liliuokalani (*lī-lē-q-ō-kā-lā-lā-nā*), (1838-1917), queen of Hawaiian Islands (1891-98); author of words of 'Aloha Oe', a famous Hawaiian song; H-245

Lille (*līl*), manufacturing city of n. France on Deule River; pop. 205,000; L-136, *map* F-179
recovered by Allies W-164
Lille University (founded 1530) L-136
Lillie, Gordon W. ("Pawnee Bill") (1860-1942), American pioneer, born Bloomington, Ill.; official interpreter to Pawnee Indians; managed Pawnees in first Buffalo Bill Wild West Show 1883-86; later professional showman for years; led Oklahoma "land rush" 1889; noted for work among Pawnee Indians and for activities to perpetuate buffalo.
Lilliputians (*lī-lī-pū-shānz*), in Swift's 'Gulliver's Travels', tiny inhabitants of Lilliput S-343-4
Lilly "the Enthusiast." *See in Index* Lyly
Lily, a plant L-136-7, *pictures* L-137, F-122
poison in P-274
structure of flower, *pictures* F-122, 123, 124, 125, 126
water-lilies W-47-8, *pictures* W-47, P-242, B-204
Lilybaeum (*lī-lī-bē-ūm*), ancient city on Lilybaeum Promontorium (Cape Boeo), w. extremity of Sicily, founded by Carthaginians; starting point of Romans on African military expeditions; modern Marsala; pop. 65,000; famous for wine; *map* I-156
Lily family, or Liliaceae (*lī-lī-ā-sē-ē*) L-137
Lily-of-the-valley L-137
Lima, Ohio, industrial city on Ottawa River, 70 mi. s. of Toledo; pop. 44,711; locomotives, steel products, automobile bodies, neon signs, cigars; state hospital for criminal insane; *map* O-210
Lima (*lī-mā*), Peru, capital of Peru; pop. 285,000; L-137, *maps* S-206b, d, P-140, *pictures* F-139, L-67j, p
San Marcos Univ. library L-1000
Lima, Declaration of L-07p
Lima bean B-65
when and how to plant G-13
Liman von Sanders, Otto (1855-1929), Prussian general; in command of Turkish army which defeated allied attack on Gallipoli peninsula 1915; in 1918 in command of army in Palestine which was crushed by General Allenby.
Limmer pine, evergreen tree (*Pinus flexilis*) of pine family, found at high altitudes in scattered localities from Alberta to Mexico and California. Grows to 50 ft.; trunk short, thick. Leaves in fives, to 6 in. long, dark yellowish green, bunched at ends of branches. Cones oval, to 6 in. long, light brown.
Limbourg, Pol, Hermann, and Hannequin, de, French painters, three brothers, of 15th century; Pol was most talented; chief work 'Book of Hours of Duc de Berry', an illuminated manuscript in which snow scenes and other landscapes dotted with figures were painted with a remarkable sense of design and of realism; said to have established a typical French tradition of landscape painting.
Limburger cheese, named for Limburg, Belgium; manufactured in northern European countries and United States; C-165
Lime, chemical compound of calcium L-136. *See also in Index* Limestone
borate minerals M-183
cement contains C-125
glass manufacture G-101
illuminating gas purified G-22
mortar L-136

plaster uses C-19
 quicklime L-138, C-19
 rubber, vulcanizing uses R-184
 shells yield S-107
 slaked L-138
 soil acidity corrected by G-7, S-191d
 Lime, fruit of lime tree L-138
 Lime and sulphur wash, an insecticide and fungicide S-263
 Lime-julecs, or limeys, nickname given British sailors L-138
 Lime light, use in stage lighting caused it to be metaphoric expression for prominence L-138
 Limequat, a citrus fruit L-138
 Limerick, county of w. Ireland, in province of Munster; 1034 sq. mi.; pop. 100,000; includes most of Golden Vale, most fertile district in Ireland; chief river, Shannon.
 Limerick, or Luimneach, Ireland, at head of estuary of river Shannon; pop. 41,000; most important port on w. coast; chief products lace, flour, salmon, bacon; a county borough with its own county council; treaty ending struggle between James II and William III signed here in 1691; gave name to limerick verse: map I-129
 Limerick, nonsense verse L-138
 Limestone, calcium carbonate (CaCO₃) L-138
 cave formation C-118, C-19, N-20-1
 cement uses C-125
 chalky forms C-137a
 corals secrete C-384
 Indiana or Bedford L-138, Q-3, picture I-49
 iron smelting utilizes I-138, picture I-136
 magnesian (dolomite) M-182; Alpine district A-136
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 sedimentary rock G-39
 shell contains S-107, L-138
 soil acidity corrected by L-138, G-7, S-191d
 Yellowstone Park, picture Y-205
 Lime tree, citrus tree yielding a small green fruit L-138
 introduced into Europe C-408
 Limetree, local name applied to the linden tree L-148
 Lime water, solution of slaked lime in water L-138
 Limeys, nickname given British sailors L-138
 Limitation of armaments. See in Index Armaments, limitation of
 Limitations, Statutes of, laws in England and U. S. by which right of bringing action is limited to a fixed period after the events on which the action is based.
 Limited monarchy D-47, G-128
 Limmat (lîm'ât), river of Switzerland; rises at n. end of Lake Zürich flows n.w. 18 ml. to Aar River; upper course called Linth at Zürich Z-232
 Limoges (lê-môzh), town in w. cent. France on Vienne River; pop. 95,000; taken by Black Prince 1370; porcelain manufacturing center: map P-179
 enamel ware E-264
 Limon (lê-môn'), chief seaport of Costa Rica, on a bay of the Caribbean; pop. 16,000; founded 1871; port for shipment of coffee and bananas: map C-132
 Limon Bay, Panama P-52
 Limonite (lîm'ô-nî't), a yellowish iron ore I-135, M-182
 Limousine, automobile A-393
 Limpet, a gastropod mollusk which clings to rocks M-219
 homing instinct A-202

Limpkin, a large rail-like bird (*Aramus pictus pictus*) closely related to cranes; plumage dark brown with white markings; frequents southern swamps; feeds on aquatic insects and frogs; its mournful wail suggested its titles "the lamenting bird" and the "mad widow."

Limpopo (lîm-pô'pô) River, in e. part of South Africa; forms n. boundary of Transvaal, then flows s.e. through Portuguese East Africa 1000 mi. into Indian Ocean; scene of Kipling's "Elephant's Child": map E-139, picture M-294

Linnaceae (lî-nâ'sê-ô). See in Index Flax family

Linaere (lîn'â-kêr), Thomas (1480?-1524), English humanist, physician and divine; physician to Henry VII and Henry VIII; helped found College of Physicians, of which he was first president; but famed chiefly as classical scholar.

Linaurus, low growing annual plants of the phlox family, native to western N. America. Leaves threadlike; flowers tiny starlike funnels or saucers, white through purple, completely cover the plant in a mass of bloom; used in rock gardens; sometimes called ground pink.

Linaria, a genus of plants of the figwort family, including the toad-flax or butter-and-eggs, and Kenilworth ivy. See in Index Butter-and-eggs; Kenilworth ivy

Lincoln, Abraham (1809-65), 16th president of United States L-139-45. See also in Index Civil War administrations (1861-65) L-140, 144-5

Adams in England A-12
 cabinet, picture L-143; Seward S-86; Stanton S-271
 Civil War C-251-7

Emancipation Proclamation E-257-8, L-145; Lincoln reading, picture L-143
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 immigration encouraged I-22-3
 Lee offered command L-92
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military leaders L-145, C-254, G-132
 Nevada admitted to Union N-78
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lawyer L-140, S-263
 Lowell's tribute L-139
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Mexican War opposed by L-142, P-206
 political career L-140, 142, 144-5

slavery views and policy L-140, 142, 144, 145
 statues: Barnard S-84; Borglum N-80, picture S-83; Saint-Gaudens S-7

tomb at Springfield, Ill. S-263
 White House study restored by Mrs.

Hoover, picture W-87
 Whitman's poem on W-95
 wife and sons W-91-2, L-142, picture L-144

Lincoln, Benjamin (1783-1810), American general prominent in Revolutionary War; secretary of war 1781-84; commanded Massachusetts militia and suppressed Shays' Rebellion (1787).

Lincoln, Joseph C. (born 1870), American novelist and short story writer, born Brewster, Mass.; writes with kindly humor of quaint Cape Cod characters ('Cap'n Eri', 'Rugged Water', 'Queer Judson', 'The Aristocratic Miss Brewster', 'Blowing Clear'; 'Cape Cod Yesterdays').

Lincoln, Mary Todd (1818-82), wife of Abraham Lincoln W-91-2, L-142, picture L-144

Lincoln, Robert Todd (1843-1926), American lawyer, son of Abraham Lincoln; secretary of war 1881-89; minister to Great Britain 1889-93; W-92, picture L-144

Lincoln, Thomas (1778?-1851), father of Abraham Lincoln L-139-40

Lincoln, England, capital of Lincolnshire, on Witham River 125 mi. n. of London; pop. 66,000; Roman remains; live stock market, iron manufactures: map E-270a
 cathedral E-280, picture E-281

Lincoln, Ill., industrial city 28 mi. n.e. of Springfield in agricultural and coal-mining region; pop. 12,752; named for Abraham Lincoln; Lincoln College.

Lincoln, Neb., state capital in s.e.; pop. 81,984; distributing point for large farming district: N-60, map N-57
 capitol, picture N-59
 state university, picture N-59

Lincoln College, Oxford O-280
 Lincoln-Douglas debates L-145, L-142, D-87

Lincoln Highway, a sea-to-sea national highway R-112, 114
 Lincoln Memorial, Washington, D. C. W-26, pictures L-139, 142, W-27

Lincoln Memorial Garden, Springfield, Ill. S-264

Lincoln Memorial University, institution of higher learning at Harrogate, Tenn., established 1897; non-sectarian; purpose is to make education possible for students of limited means.

Lincoln Park, Mich., residential suburb of Detroit, about 10 ml. s.; pop. 15,236.

Lincoln Park, Chicago, picture C-198
 Lincoln's birthplace, national monument in Kentucky N-19

Lincoln sheep S-106, picture A-52
 Lincolnshire, agricultural county in e. England; 2646 sq. mi.; pop. 466,000.

Lincoln's Inn Fields, a famous square in London laid out by Inigo Jones; named for Lincoln's Inn, on east side, a building occupied by a guild of lawyers.

Lincoln University, at Jefferson City, Mo.; founded 1866; for Negroes; arts and sciences, law.

Lincoln University, at Lincoln University, Pa.; founded 1854 by Presbyterian church; for Negroes; arts and sciences, theology.

Lind, Jenny (1820-87), the "Swedish nightingale," famous and beloved soprano singer; pupil of Adolf Lindblad; toured U.S. 1850-52 under management of P. T. Barnum; married her accompanist, Otto Goldschmidt.

- Lindbergh, Anne Spencer Morrow (born 1906), American aviator and writer, wife of Charles A. Lindbergh; first woman to receive Hubbard gold medal of National Geographic Society 1934 for work as co-pilot and radio operator: L-147-8
- Lindbergh, Charles A. (1859-1924), American congressman L-146
- Lindbergh, Charles A. (born 1902), American aviator L-146-8
beacon named for: Los Angeles, picture L-198
Medal of Honor D-31
New York to Paris flight L-147, picture A-68, table A-74
picture taken by, Maya ruins E-345
scientific contributions L-147
'Spirit of St. Louis', picture A-68
transatlantic flight L-147
- Lindblad, Adolf (1801-78), Swedish composer; many songs, a symphony, and opera, 'Fröndöerna'; wrote music for Swedish national hymn 'Ur Svenska hjertens' (From Swedish Hearts).
- Linden, N. J., residential and industrial city, suburb of New York City; pop. 24,115; oil, gasoline, alcoholic liquor; automobile assembly plant.
- Linden, a shade tree L-148
American, pictures T-133, 134, 135
- Linden family, or Tiliaceae (*tīl-i-ā'-sē-ē*), a family of plants, shrubs, and trees, including the basswood, lindens, grewtias, jute, and Jew's-mallow; sometimes called the basswood family.
- Lindenwood College for Women, at St. Charles, Mo.; Presbyterian institution founded 1827; arts and sciences.
- Lindsay, (Nicholas) Vachel (1879-1931), American poet and lecturer, born Springfield, Ill.; several times wandered through country on foot reciting and selling his verses for bread; wrote virile, rhythmic verse, which he held should be read aloud or chanted: A-182
- Lindsay, Sir Ronald (born 1877), British diplomat; of a noted family; served in Russia, Persia, France, and other countries; ambassador to Germany 1926-28; permanent under-secretary of state for foreign affairs 1928; British ambassador to U. S. 1930-39.
- Lindsay, Ontario, Canada, town on Scugog River 58 mi. n.e. of Toronto in fertile farming area and scenic lake region; pop. 7,505; flour, woolen, and lumber mills, machinery factories, chemical works.
- Lindsey, Benjamin Barr (1869-1943), American judge and social reformer; born Jackson, Tenn.; admitted to Colorado bar 1894; revolutionized methods of handling delinquent children ('Problems of the Children'; 'The Revolt of Modern Youth'; 'The House of Human Welfare'; 'The Companionate Marriage'): J-232
- Line, in geometry G-46-52
- Linear measure M-115, table W-67
origin of the foot F-143
- Linear motion, in physics P-192
- Line engraving
on metal B-294-5, picture E-295
on wood B-294
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- Linen L-148, F-105-6, T-71
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English hand-blocked T-68
manufacturing centers C-274, I-129
testing for purity L-148
thread T-85
- Linen-fold carving, on furniture I-99, 100, picture W-138
- Line of cleavage, in crystals C-409
- Line of Demarcation, imaginary line from North Pole to South Pole, 100 leagues w. of Azores; fixed 1493 by Pope Alexander VI: A-142
- Line officer, U. S. Army A-307d
- Liners, ocean C-323, S-120-30
- Linesman, in football F-151
- Lines of force, magnetic, imaginary lines along which magnetic force is exerted E-227, 228, 229, M-34
electric generator and motor, action in E-216-8
electromagnetic theory of Clerk-Maxwell R-13
Faraday's discovery C-265
iron filings show, picture M-35
- Line squall W-60
- Linsfeld College, at McMinnville, Ore.; Baptist institution founded 1858; arts and sciences.
- Ling (*ling*), Per Henrik (1776-1839), Swedish poet and creator of Swedish gymnastics; was principal of Royal Gymnastic Central Institute in Stockholm.
- Ling, or heather H-263
- Ling, burbot, or lawyer, fresh-water fish (*Lota maculosa*), only member of cod family found exclusively in fresh water.
- Lingenberry (*ling'gēn-bēr-i*), or cowberry, a low growing shrub (*Vaccinium vitis-idaea*) of heath family, native to n. Europe and Asia. Creeping, evergreen; leaves oblong; flowers white or pink in small clusters; fruit small, dark red, oblong, in clusters. Named "lingon" or "kroosa" in Denmark and Sweden. North American variety is smaller; native from Massachusetts to Alaska; called mountain cranberry.
- Link, unit of length in surveying S-332
- Linked Hands Flag F-98, color plate F-80
- Lilithgow (*līl-i-th'gō*), Victor Alexander John Hope, 2nd Marquess of (born 1887); scholarly politician, formerly a banker; viceroy and governor general of India, 1936-43: I-40
- Linn, local name applied to the linden tree L-148
- Linnæa, or twin-flower, a delicate, creeping evergreen wild flower (*Linnæa borealis*) of honeysuckle family, with thread-like, upright flower stalks, each topped with two fragrant drooping, bell-shaped rose or white flowers; named after Linnaeus.
- Linné (*lī-nā'*), or Linnæus, Carl von (1707-78), Swedish botanist and naturalist L-148-9, B-116
- Linnet, or redpoll, a small European song-bird (*Linota caunabina*) of the finch family, so called because it feeds on the seeds of flax (*Linum*).
- Lino'leum and oilcloth L-149
- Lino'type L-149-53
invention L-149
newspapers use N-104, picture N-105
setting up a line of type L-150-1
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type metal A-132
- Linseed (flaxseed) oil F-105
a "drying oil" F-19
paints P-32a
printer's ink I-80
raw and boiled F-32a
- Linsay-woolsey, a cloth P-221d
- Lint, cotton C-376, 378
- Lintel, in architecture, horizontal piece at top of door or window.
- Linters, fibers from cottonseed source of cellulose R-55, C-123
uses C-379, pictures C-381
- Linton, William James (1812-97), English wood engraver and republican reformer; in later years lived in New Haven, Conn.; considered greatest wood engraver of his day ('Practical Hints on Wood Engraving'); wrote lives of Whittier and Thomas Paine.
- Linum (*lī-nūm*), the flax genus of herbs; includes the blue-flowered commercial flax (*Linum usitatissimum*); also several species, especially yellow linum or flax (*L. flavum*) and scarlet flax (*L. grandiflorum coccineum*), cultivated in gardens.
- Lin Yutang (born 1895), Chinese philosopher and writer, born Changchow, Fukien Province, China; son of pastor of American Reformed Church mission; professor at Peking National University 1923-26; in New York City after 1935; interprets China with urbane humor ('My Country and My People'; 'The Importance of Living'; 'Moment in Peking'; 'With Love and Irony')
quoted C-221e
- Linz (*līnts*), Germany, Danube River port, 80 mi. w. of Vienna; pop. 102,000; large trade by rail and river; makes tobacco products, farm implements, boats, cloth: map A-381
- Lion L-154-5, pictures L-154, Z-219, C-237g
cat family, member of C-95-6
distinguished from tiger T-92, 93
habits A-36d
heraldic device H-281
length of life, average, photograph A-198
method of capturing Z-219
price paid for by zoos Z-221
range L-154; Africa A-36; India I-34
story, 'Androcles and the Lion' L-155
- Lion, or Leo, a sign of the zodiac. See in Index Leo
- Lion, Gulf of, the wide bay of Mediterranean washing most of s. coast of France F-172, map F-179
- Lion fish, picture F-67
- 'Lion of Belfort', sculpture by Bartholdi B-52
- Lion of Belgium, picture B-89
- 'Lion of Justice' H-276
- 'Lion of Lucerne', sculpture by Thorvaldsen T-85, picture T-85
- 'Lion of the North,' Charles XII C-154
- Lions, Court of, in Alhambra, picture S-233
- Lions Clubs, International Association of, formed in 1917, business men's clubs devoted to the promotion of high ethical standards and the encouragement of efficiency in business and the professions; each club allows only one active member from each business and profession. The motto of the clubs is "Liberty, Intelligence, Our N-ation's Safety."
- Lionsgate Bridge, in Vancouver, B.C., Canada, table B-342
- Lion's heart. See in Index Physostegia
- Lipari (*lī-pā-rē*) Islands, or Aeolian Islands, Italy, group of volcanic islands in Mediterranean n. of Sicily; 45 sq. mi.; pop. 20,000; largest Lipari; fruit, olives, pumice stone, alum, sulphur, nitre
volcanoes L-73, M-110
- Lipase, an enzyme E-299

- Lipchitz (*lĕp-shĕts'*), Jacques (born 1891), Polish abstract sculptor, worked chiefly in France; influenced by cubists and negroid sculpture; work noted for extreme simplification.
- Lipins, organic compounds B-109 oxidation B-110
- Li Po (*lĕ pō*), or Li Tai-po (*lĕ tī pō*) (701?-762?), Chinese poet, one of greatest; favorite of emperor; wrote exquisite poems of love, wine, and beauties of nature; said to have drowned trying to kiss reflection of moon at side of his boat.
- Lippe (*lĭp'p*), state in W. Germany, formerly principality; 469 sq. mi.; pop. 190,000; capital Detmold; forests, in which beech predominates, cover 130 sq. mi.
- Lippershey, Jan (died 1619), Dutch optician; made a telescope in 1608, thought to be first made.
- Lippi (*lĭp'pĕ*), Filippino (1400?-1505?), Florentine painter, son and pupil of Fra Filippo Lippi and pupil of Botticelli; his work more ornamental than his father's, more realistic and less poetical than Botticelli's ("Vision of St. Bernard"; "Adoration of the Magi").
- Lippi, Fra Filippo (1406-69), Florentine painter, probably the greatest colorist of his day; his pictures reveal a strong, naive nature, with a lively and somewhat whimsical observation; P-10
- Madonnas M-20
- Lippmann, Walter (born 1889), American writer, editor, and social philosopher, born New York City; studied at Harvard under George Santayana and William James; one of founders of *New Republic*; member Peace Commission following 1st World War; editor *New York World* 1920-31; editorial writer *New York Herald Tribune*; analyzes political and social problems ("A Preface to Politics"; "Public Opinion"; "A Preface to Morals"; "The Good Society").
- Lip-reading, aid to deaf D-22
- Lipschitz, Jacques. *See in Index*
- Lipchitz, Jacques
- Lip'ton, Sir Thomas (1850-1931), English merchant and yachtsman, born Glasgow, Scotland; son of poor Irish parents; made start by advertising small provision store; developed business until he amassed great wealth and owned large plantation of tea, coffee, and cocoa *America's Cup* B-184
- Liquefied gases, gases made liquid by repeated chilling under pressure G-18
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- Liquid air L-155
- laboratory experiment, picture P-195
- Liquidambar. *See in Index* Red gum
- Liquid assets B-39
- "Liquid" coal C-288
- Liquid measure, table W-67
- Liquorice, or licorice L-123
- Liquor laws
- American Indian I-66
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- Göteborg (Gothenburg) system in Sweden S-338
- prohibition P-350-1
- United States P-350
- work of W. C. T. U. W-131
- Liquors, distilled A-112
- Lira (*lĕ'rā*) (plural lire) (from Latin *libra*, pound), the monetary unit of Italy, nominally worth 5¼ cents but variable in value; formerly worth 19.3 cents. Name also applied to Turkish gold 100-plaster piece, nominally worth about \$7.45; picture M-220a
- Lisa, Manuel (1776?-1820), Spanish fur trader; led first important expedition up the Missouri 1807 and built Fort Manuel at mouth of Big Horn River; with Andrew Henry, Jean Pierre Chouteau, and others founded Missouri Fur Company (1808-9) and built Fort Lisa near mouth of Big Knife River in North Dakota; traveled up and down Missouri at least 12 times; F-226, S-219-20
- Lis'bon, also Lisboa, capital of Portugal; pop. 595,000; L-156, P-312, 313, maps E-318a, S-226, picture P-314 earthquake (1755) E-138
- Lisgar, John Young, Baron (1807-76), English statesman, born Bombay, India; chief secretary for Ireland, lord high commissioner of Ionian Islands, and governor of New South Wales; governor general of Canada, 1869-70.
- Lisle, Leconte de. *See in Index* Leconte de Lisle
- Lisle, Rouget de. *See in Index* Rouget de Lisle
- Lisle (III), a hard, twisted thread originally of linen, now often of specially prepared cotton origin of name L-138
- Lis'ter, Joseph, Baron (1827-1912), English surgeon; developed antiseptic surgery A-222, I-116
- Listing, in agriculture
- contour D-113c, pictures A-57, E-145f
- corn planting C-867
- erosion control D-113c
- Lists, in medieval tournament K-30
- Liszt (*lĭst*), Franz (1811-86), Hungarian composer L-156-7
- figures in Elliot's "Daniel Deronda" E-254
- gypsy influence L-156
- Lit (*lĕt*), or litas, the monetary unit of Lithuania since 1922, nominally worth about 10 cents.
- Li Tai-po. *See in Index* Li-Po
- Lit'any, a liturgical prayer in which the clergy lead and the choir or congregation respond (from Latin *litania*, a prayer); used in Catholic and in Episcopal and some other Protestant churches.
- Litchfield, Conn., village 28 mi. w. of
- Hartford; pop. 1234; birthplace of Harriet Beecher Stowe and Ethan Allen; first school of law (1784)
- first temperance society T-44
- Litchi, lichee, or lee-chee, a Chinese tree (*Litchi chinensis*) having leathery pinnate leaves and delicious strawberry-like fruit; also grown in Cochín-China and Malay Archipelago; N-188
- Liter (*lĕ'tĕr*), unit in metric system (1.0567 liquid qts.) M-130
- Literature L-61d-63, Outline L-62-3. *See also in Index* Humor; Satire; also chief topics below and individual writers by name
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u=French u, German ü; gem, go; thln, then; n=French nasal (Jean); sh=French j (z in azure); k=German guttural ch

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Lith'argo, lead monoxide L-76
chemical composition C-176
Lithia (lithium oxide), often used for
a combination lithium citrate and
other salts to produce effervescence
in medical preparations.
Lith'um, an alkali chemical element
A-128, C-174, table C-168
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Lithog'raphy L-164, E-298
Lithopono, substitute for white lead
A-128, P-32
in rubber goods R-168
Lith'osphere, the solid body of the
earth E-132
Lithuania (*lit'ya-ŭ-n'ŭ*), republic
of Soviet Russia on Baltic Sea;
more than 20,000 sq. mi.; pop.
3,000,000: L-164, maps P-278,
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Litotes (*lit'ô-têz*), a figure of speech
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i-ô-rêz*) R-74
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tic E-289, P-288, map A-215, pic-
tures P-285, R-17
Little Bear, or Ursa Minor, a constel-
lation, containing the Pole Star, charts
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Little Belt, strait between Fünen
Island and mainland of Denmark;
Swedish army under Charles X
marched across it on ice to Fünen
in 1658; map D-53
'Little Belt', British sloop W-3
Little Belt Mountains, range of Rocky
Mountains, in Lewis and Clark Na-
tional Forest, Montana; map M-243
Little Big Horn River, in s. Montana,
flows north across Crow Indian
Reservation for 60 mi. and enters
Big Horn River
scene of Custer massacre C-415
'Little Bo-Peep', origin M-272
'Little Boy Blue', poem by Eugene
Field F-31
'Little Church Around the Corner,'
Episcopal "Church of the Trans-
figuration" in New York City on
29th St., one door from 5th Avenue;
received nickname, 1870, when
Joseph Jefferson, arranging funeral
for an actor friend was turned
away from one church and advised,
"There's a little church around the
corner that might accommodate
you"; nickname persisted and
church remained a favorite with
theatrical people.
Little Colorado, or Colorado Chiquito,
river in Arizona, one of chief tribu-
taries of Colorado River: maps
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'Little Corporal,' Napoleon N-7
Little Crow (1810-63), Sioux Indian
chief M-195
Little Dipper. See Little Bear

Little Dog, or Canis Minor, a constel-
lation, charts S-275, 275f, h
Little Dorrit, the heroine of Dickens'
novel of the same name, who is
born, brought up, and married in
the prison where her father was
confined for debt.
'Little Egypt,' a section of Illinois
I-14
Little Entente E-326, 326a, B-20,
Y-212
Little Falls, Minn., city 84 mi. n.w.
of St. Paul; pop. 6047; granite,
flour, paper; map M-192
boyhood home of Lindbergh L-146
Little Falls, N. Y., manufacturing city
on Mohawk River and Barge Canal
20 mi. s.e. of Utica; cascades in
river give excellent water power;
pop. 10,168; knit goods, dairy prod-
ucts, bicycles, machinery, felt shoes;
destroyed by Indians and Tories in
1782, resettled in 1790; Gen. Herkli-
mer's grave near by: map N-114
Littlofold, Catherine (born 1908),
ballet dancer and choreographer,
born Philadelphia; premiere dan-
seuse Philadelphia Grand Opera Co.
1926-38; founded Littlefield Ballet
1935; created several ballets on
American themes: 'Barn Dance';
'Terminal'.
'Little Giant,' nickname of Stephen A.
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'Little Jack Horner', nursery rhyme,
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Little John, a member of Robin
Hood's band of outlaws R-118
Little Kanawha River. See in Index
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Little Khingan. See in Index Khingan
Little Lord Fauntleroy, seven-year-
old hero of Mrs. Frances Hodgson
Burnett's story of that title. His
curls and velvet suits set a fashion
for small boys.
'Little Magician,' nickname of Martin
Van Buren V-270
Little Miami River, tributary of Ohio
River; 140 mi. long: map O-210
'Little Minister, The', novel by Barrie;
Babbie, daughter of a village
squire, in the guise of a gipsy, wins
the love of Gavin Dishart, the little
minister; background of Scottish
village life.
Little Missouri River, tributary of the
Missouri, rising in Wyoming and
flowing 450 mi. through Montana
and North and South Dakota: map
N-162
Little Mountain State, popular name
for West Virginia.
Little-neck clam, or quahaug C-259
shell used for wampum S-108
Little Nell, sweet unselfish child-
heroine of Dickens' 'Old Curiosity
Shop', who dies from weariness and
privation.
Little Pee Dee River, tributary of Pee
Dee River in South Carolina: map
S-213
Little pike, or pickorel, a fish F-74
'Little Rhody,' popular name for
Rhode Island.
Little Rock, Ark., capital and largest
city, on Arkansas River; pop. 88,-
039; Camp Joseph T. Robinson
near: A-298, map A-296
capitol, picture A-297
Civil War A-299
Little Russia. See in Index Ukraine
Little St. Bernard Pass, Alpine pass
(7180 ft.) in Italy s. of Mont Blanco;
connects valleys of Dora Baltea and
Isère.
'Little Sally Waters,' game P-257
Little Sisters of the Poor, founded in
France 1640, extended to U. S.

1868; for relief and nursing of the
aged, and infirm poor
vows M-236
Little Talks on Great Things, by
Arthur Mee
Chivalry R-161-2
Courage C-363-4
Faith F-6
Friendship F-205
Honesty H-381
Honor of the Playing Field A-357
Humility H-355
Imagination I-21
Obedience O-192
Optimism O-236-7
Purity P-370
Value of Time T-97
'Little theaters,' theaters in which
groups, chiefly amateurs, produce
experimental dramas: T-77
Littleton, Sir Thomas de (1407?-81),
English judge and writer on law;
famous for his book, 'Treatise on
Tenures', dealing with English land
laws of his day; still used as an
authority after 800 years.
Little Trianon Palace, or Petit Tri-
anon, at Versailles V-289
'Little White Bird', a novel by Barrie
B-51
'Little Women', book by Louisa M.
Alcott A-112, 113
Littoral nation, one with shore lines
I-109
Littoria, Italy, province on land re-
claimed from Pontine marshes s.e.
of Rome; has fertile farm lands and
five cities; pop. 225,000; cap.
Littoria (20,000): I-160
Liturgy (from Latin *liturgia*, mean-
ing a public service), term applied
to any or all of the services used
in public worship; especially in
Roman Catholic, Greek Catholic,
and Episcopal churches.
Litvinof (*lit'-vô-nôf*), Maxim Max-
imovich (born 1876), Russian
statesman; a revolutionary from
youth; diplomatic agent of soviet
government in England after Bol-
shevik revolution; commissar for
foreign affairs 1930-39; ambassador
to the U. S. Nov. 1941-Aug. 1943.
Lukiu (*lû'k' lû'k'*) Islands, Japan,
also Nansel, and Ryukyu; 921 sq.
mi.; J-185, map J-186
Live-forever, houseleek, or hen-and-
chickens, perennial plants of the
family *Cressulaceae*; thick, succu-
lent leaves, often in rosettes close
to the ground; white, green, rose, or
yellow star-shaped flowers.
Livens projector, picture A-307b
Livo oak O-169, 190
Liver, in human body L-165
function of, picture P-205
Liver fluke W-180a
Liverleaf, or hepatica, a plant of the
crowfoot family, with liver-shaped
leaves H-261
Livermore, Mary Rice (1821-1905),
American reformer, early advocate
of abolition of slavery, prohibition,
and woman's suffrage; first won
reputation during Civil War as
worker for Sanitary Commission.
Liverpool, England, 2d seaport of
British Empire and leading port of
Great Britain for export trade; on
estuary of Mersey River; pop.
655,000: L-165-6, map E-270a
cathedral C-100
world's greatest wheat market W-83
Liverpool, University of L-166
Liverpool and Manchester Railway,
England, early railroad L-176
Liverpool Mountains, range in e. New
South Wales, Australia; highest
point 4500 ft.

Key—cápe, át, făr, fâst, whet, fáll; mē, yēt, fērn, thäre; tce, bít; rōw, wón, fôr, nôt, dğ; cūre, băt, rŭde, fŭll, bŭrn;

Liverpool pottery P-332
Livorworts L-166
 confused with mosses M-272
Live stock, Outline A-60. See also in *Index* Breeding, animal; Dairying; Domestic animals; Forage crops; Meat packing; and names of animals given below
 animals injurious to Z-230
 ass A-337-8
 cattle C-101-7: range management C-107-15
 goats G-108-9
 hogs H-314-16
 horses H-341-5
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 plants injurious to P-274, C-107; loco weed W-64-5
 poultry P-336-9
 registration in America A-54
 reindeer R-71
 sheep S-104-6
 United States bureaus of Animal Industry and Dairy Industry U-228
Livingston, Edward (1764-1836), American statesman and jurist, born Clermont, N. Y.; served successively as congressman, senator, secretary of state under Jackson, and minister to France
 compiles Louisiana Code L-207
Livingston, Phillip (1716-78), signer of Declaration of Independence; born Albany, N. Y.
Livingston, Robert R. (1746-1813), American statesman, born New York City; brother of Edward Livingston; first chancellor New York state 1777-1801; minister to France 1801-05
 aids Fulton F-217
 Declaration of Independence D-28, picture R-81
 defends Constitution U-209
 Louisiana Purchase L-209
Livingston, William (1723-90), American lawyer, born Albany; attacked English Parliament's interference in provincial matters and Anglican domination of King's College; representative from New Jersey to first and second Continental Congress; governor of New Jersey 1776-90.
Livingston, Mont., city on Yellowstone River, 45 mi. n. of Yellowstone Park, in agricultural region; pop. 6642; railroad machine shops; hunting and fishing resort: map M-248
Livingstone, David (1813-73), great missionary explorer of Africa L-167-9, A-40
 books by and about L-169
 discovers Victoria Falls V-296
 Stanley's search for S-270-1
Livingstone Mountains, range in Tanganyika Territory bordering n.e. shores of Lake Nyasa; highest point 9600 ft.: E-139-40
Liv'ius *Andronicus* (*ān-drō-nī'kūs*) (8d century B.C.), first known Roman poet L-68
Live'nia, district in s. Esthonia and n. Latvia; a former Baltic province of imperial Russia with capital at Riga; 17,574 sq. mi.: L-71
Livorno (*lī-vōr'nō*). See in *Index* Leghorn
Livro (*līv'rū*), an old French silver coin worth about 19.8 cents, replaced by franc in 1795; originally equalled English pound in value (from *libra*, Latin for "pound").
Livy (*līv'ī*), anglicized name of Titus Livius (59 B.C.-17 A.D.), Roman historian, great prose writer of Augustan Age; 85 of the 142 books of his history of Rome still exist: L-89

Lizard, The, or Lizard Head, a bold promontory of Cornwall; the most southerly point of Great Britain: map E-270a
Lizards, scaly-bodied, four-legged reptiles L-169-72, R-78, pictures L-169, 170, 171, 172, D-88
 Australia A-375
 evolution L-172
 foot, pictures F-147
 kinds L-169-72
 basilisk, helmeted or hooded I-11
 chameleon C-137b-38
 dragon or giant, discovery of E-346
 flying-dragon D-88, L-170
 horned toad L-171-2, P-354
 iguana I-11
 tuatara related to L-172
 venerated in ancient Egypt E-210
Ljubljana (*lōb-lē-yū'nā*), Yugoslavia, formerly Laibach, Slovenian city 50 mi. n. of Fiume; pop. 60,000; old castle and cathedral; various manufactures; Congress of Laibach 1821, at which emperors of Austria and Russia were present, restated the fundamental principles of the Holy Alliance: map E-326d
Ljusno (*ygs-nī'*) River, Sweden, flows 220 mi. s.e. into Gulf of Bothnia: map N-173
Llama (*lā'mā*), wool-bearing South American animal of camel family L-173, C-39, pictures S-208k, L-173
 altitude range, picture Z-228
Llaneros (*yā-nā'rōs*), cattlemen of Venezuela V-275
Llano Estacado (*yā'nō ēs-tā-kū'dō*), or Staked Plain, arid plateau in n.w. Texas and s.e. New Mexico; over 40,000 sq. mi.: T-57, N-96
Llanos (*yā'nōs*), plains P-200
 South America S-208f, map S-208d:
 Bolivia B-170; Colombia C-305; Venezuela V-274-5, S-208k
 Texas plains C-108
Llanquihue (*yān-kē'wō*), Lake, in s. Chile; 240 sq. mi.; extends north of Puerto Montt which is its outlet to the Pacific: picture S-205a
Llaretà, a plant. See in *Index* Yareta
Llobregat (*yō-brā-gāt'*) River, Spain, short river entering Mediterranean near Barcelona.
Lloyd, Harold Clayton (born 1894), American motion picture actor born Burchard, Neb.; began as "extra" at 19; famous for his comedy roles in which he always wears large shell-rimmed glasses; organized own company 1923 ('Safety Last'; 'Girl Shy'; 'The Freshman'; 'Welcome Danger').
Lloyd George, David (born 1863), British statesman, prime minister 1916-22: L-173-5, E-276
 Irish home-rule policy I-128-9
 Peace Conference, W-173, L-175, picture U-249
 social legislation E-275, L-174
Lloyd's, insurance organization I-94
Lloyd's Barrage, in the Indus River at Sukkur in the province of Sind, India; a dam 4620 ft. long, built 1929; irrigates 5,300,000 acres; one of world's greatest irrigation projects.
Loading coils, in telephone action explained E-230
 Pupin invents P-368a
Load line, of ship, picture S-129
Loam, soil S-191a, d
Loanda (*lō-ān'dā*) (São Paulo de Loanda), chief seaport of Angola; pop. 20,000; former center of slave trade: map A-42a
Loango (*lō-āng'gō*), port of Middle Congo colony, French Equatorial Africa, 100 mi. n. of mouth of Congo; pop. 12,000: map A-42a

Loans, financial B-39, 41, E-150. See also in *Index* Banks and Banking; Bonds; Credit
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 credit in business C-392-4
 farm credit F-12
 Liberty, in 1st World War W-170
 life insurance I-95
 mortgage S-291, C-392, F-12
 notes C-394
 small-loan institutions B-44-5
Loan shark, laws for protection against B-44
Lobbying, practise of influencing legislators; word taken from *lobby*, part of assembly hall where private persons are permitted to interview legislators; may be influence for public good or for promoting private or corporate interests to public detriment.
Lobe, of lungs, picture L-219
Lobelia, a genus of herbs of the family *Campanulaceae* with alternate leaves and white, blue, or red flowers; corolla very irregular; includes *Lobelia inflata* (Indian tobacco) used in medicine; *L. cardinalis*, cardinal flower
 when and how to plant G-7, 10
Lobliolly pine P-220-21
Lob Nor, or Lop Nor, shallow lake in Gobi Desert A-328, map C-211
Lobster L-175-6
 compared with crabs C-388
 spiny lobster, or sea crawfish, related to, color picture O-200a-b
Lobster backs, name given British soldiers L-175
Lobster pot L-176
Lobworm, a marine annelid (*Arenicola marina*) about 8 inches long, with bright red gills on its central segments; burrows in sandy shores between tide marks; used for bait; also called lugworm and lugbait.
Local anesthetics A-196-7, B-111
Local government. See also in *Index* City; Municipal government; State government
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 boroughs, New York City N-134
 city C-240-1
 colonial A-152, 153-4, R-98-7
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 "hundred," in Delaware D-41
 Illinois mixed type I-18
 principle preserved by William the Conqueror W-101
 southern (county) type V-304, C-382
 town T-117, R-96-7, C-340
Local option P-350
Local time T-94
Locar'no, Switzerland, town at n. end of Lake Maggiore; pop. 10,000; Madonna del Sasso sanctuary; Treaties of Locarno signed here.
Locarno, Treaties of (1925) W-178
 signatures, picture W-178
Loch (*lōk*), Scottish word for lake. See in *Index* names of lakes, as Lomond, Loch
Lochinvar (*lōk-in-vār'*), in Scott's 'Marmion' hero of ballad 'Young Lochinvar', "so faithful in love and so dauntless in war."
Lochy, Loch, w. Scotland S-44
Lock, in wrestling W-183
Locke, Alain Le Roy (born 1886), Negro author and historian, born Philadelphia; studied at Harvard, Oxford (Rhodes Scholar 1907), Berlin; professor of philosophy, Howard University ('The Negro and His Music'; 'The Negro in America'; 'The New Negro'; 'Negro Art—Past and Present').

Looke, David R. See in Index Nasby, Petroleum V.

Locke, John (1632-1704), English philosopher and political economist; his epoch-making 'Essay Concerning Human Understanding' maintains that experience is the source of all ideas

child education, ideas on L-158
draws Carolina constitution S-214
ideas embodied in Declaration of Independence D-28

influence B-285
political science P-294

Locke, William John (1868-1980), English novelist and playwright, born in Barbados; first interest in architecture, secretary of Royal Institute of British Architects (1897-1907); a whimsical romanticist ('The Morals of Marcus Ordeyne'; 'The Beloved Vagabond'; 'Stella Maris'; 'Septimus'; dramatized several of his novels.

Locker plants, refrigerated C-299

Lockhart, John Gibson (1794-1854), Scottish lawyer and writer (biographies of Burns, Napoleon, and Scott); son-in-law of Sir Walter Scott.

Lock Haven, Pa., residential and manufacturing city, 79 mi. n.w. of Harrisburg; pop. 10,810; paper and textile mills, chemicals, furniture and metal product factories.

Lockjaw, or tetanus A-223, 224
bacilli, picture B-12
effect on muscles M-305
puncture wounds cause, prevention B-65

Lockout, in labor disputes L-440

Lockport, N. Y., city on New York Barge Canal, named for two large locks situated there; pop. 24,379; grain and fruit trade; flour, textiles, veneers, auto radiators, paper, steel products; map N-114

Locks, canal C-68

Erle Canal, picture C-67

Göta Canal, Sweden S-337
how they work C-68, pictures C-67, 68; Panama Canal, pictures P-50-1
hydraulic lift lock on Trent Canal, picture O-227

Lake Washington Canal at Seattle S-71b

Panama Canal P-48, 52-3, pictures P-47, 49, 50, 51

Sault Sainte Marie Canal S-31, picture S-330b

Welland Ship Canal W-70

Locks and keys L-176-7

time lock, in a bank, picture B-41

Lock stitch, sewing machine S-93

Lockwood, Belva Ann Bennett (1830-1917), American lawyer and reformer; first woman permitted to practise before U. S. Supreme Court; active in woman suffrage movements; nominated for president of U. S. 1884 and 1888 by Equal Rights party.

Lockyer, Sir (Joseph) Norman (1836-1920), English astronomer and physicist; pioneer in application of spectroscopy to sun and stars; explained sunspots; between 1870 and 1905 conducted eight British expeditions for observing total solar eclipses ('Recent and Coming Eclipses'; 'The Chemistry of the Sun'; 'Inorganic Evolution')
discovered helium in sun S-242

Loco-foco, popular name for lucifer matches; also applied to a New York faction of Democratic party, because a meeting at Tammany Hall (1835) was held by the light of matches after a rival faction had turned off the lights.

Locomotive, Diesel-electric G-22, R-42, L-178, pictures R-43
speed R-45

Locomotive, electric R-41-2, pictures R-36
automatic control A-385
mine locomotive, picture C-287
regenerative braking R-42
towing locomotive, Panama Canal, picture P-50

Locomotive, pneumatic P-265

Locomotive, steam L-177-8, pictures L-177, 178, R-38, 42, 43

Baldwin Works, Philadelphia P-160
Civil War, picture C-264
development S-281, R-36-7, L-178, pictures L-178, R-37; Stephenson's inventions S-285

fuel L-178; coal, efficiency C-288
how it works S-281-4

repair shop R-41, picture R-42
reversing mechanism L-177

speed L-178, R-45

track tanks R-40-1

wood-burner, picture R-37

Loco-weed W-64-5

Lo'eust, an insect G-138-40, L-179, pictures N-30, G-138-9

African I-85

eggs G-140; numbers I-81

foot, picture F-147

grasshopper distinguished from G-140, L-179, picture N-30

metamorphosis I-88, picture G-139
migration G-140

"seventeen-year," a cicada C-235

Loeust, a rough-barked tree of the bean family L-179

called false acacia A-4

leaf, pictures L-89, L-179

Locust, honey. See in Index Honey locust

Lode, of minerals M-186, G-112

Lode'stone, a natural magnet formed of the ore magnetite (Fe₃O₄) M-34, M-182, C-326

early compass, picture C-326

Lodge, Henry Cabot (1850-1924), American political leader and historian, born Boston; senator from Massachusetts 1893-1924; led Republican party in blocking U. S. entrance into League of Nations ('The Story of the Revolution'; 'Life of Alexander Hamilton'; 'Life of George Washington')
Alaska boundary dispute R-150

Lodge, Sir Oliver Joseph (1851-1940), English physicist, exponent of psychic research, and author; did valuable foundation work in electricity and radio; principal of University of Birmingham 1900-19; in addition to autobiography and many scientific works, wrote 'Raymond, or Life and Death', and other books setting forth his belief in possibility of communication with the dead.

Lodge, Thomas (1558?-1625), English poet, dramatist, and writer of romances; his pastoral romance 'Rosalynde' gave plot to Shakespeare for 'As You Like It'.

Lodgepole pine, slender evergreen tree (*Pinus contorta*) of pine family, native to mountains from Alaska to California and Colorado. Grows 30 ft. to 80 ft.; thin bark peels off in scales. Leaves in twos, 2½ in. long; cones oval. Sometimes called jack pine, spruce pine, black jack, knotty pine, tamarack, and scrub pine. Wood used for poles, railway ties, mine timber, and lumber; also called yellow pine.

Lodi, Calif., city 32 mi. s. of Sacramento; pop. 11,079; wines and brandies, canned fruits and vegetables; grape and wine festival in September.

Lodi (lō'dō), Italy, town 18 mi. s.e.

of Milan; pop. 29,000; scene of French victory over Austrians (1796); map I-156

Napoleon at N-7

Lodi, N. J., borough on Saddle River 3 mi. n.e. of Passaic; pop. 11,552; silk dyeing and finishing.

Lodz (lōdz), Polish city 75 mi. s.w. of Warsaw; pop. 610,000; enormous recent growth due to large textile industry; scene of battle of Lodz (1914); P-277, maps P-278, E-326d-e

Loeb (lōb), Jacques (1859-1924), German-American biologist; fertilized sea-urchin eggs chemically ("artificial parthenogenesis"); developed theory that many so-called "intelligent" actions of animals are physical or chemical in nature ("tropisms").

Loeffler (lō'fler), Charles Martin (1861-1935), American composer and violinist, born Mülhausen, Alsace; wrote songs, orchestral and chamber music; impressionistic style ('The Death of Tintagiles'; 'La Bonne Chanson'; 'A Pagan Poem'; 'Canticle of the Sun').

Loening (lō'ning), Grover G. (born 1888), American aeronautical engineer, born Bremen, Germany; invented first flying boat; designed Loening monoplane and seaplane.

Loess (lōs), a type of soil S-191, picture S-191a

China C-211, 212, picture C-210

origin M-184

wind erosion D-1130, W-112

Loewe (lō'vō), Johann Karl Gottfried (1796-1869), German composer, born near Halle; cantor and teacher in Stettin; one of first to give artistic form to ballad.

Loewy, Raymond Fernand (born 1893), industrial designer, born Paris, France; came to U. S. 1919; designed streamline trains, ships, and automobiles, also buildings for New York World's Fair; author 'The Locomotive—Its Esthetics'.

Lofland, John (1798-1849), physician and author D-40d

Lofoten Islands, also Lofoden Islands, group of rocky islands off n.w. coast of Norway; 1560 sq. mi.; N-174, map N-173

Lofting, Hugh (born 1886), writer and illustrator, born Maidenhead, Berkshire, England; resident of U. S.; creator of character "Doctor Dolittle" and author of whimsical poetry and stories for young children; awarded Newbery medal 1923 for 'Voyages of Doctor Dolittle' ('Story of Doctor Dolittle'; 'Pordridge Poetry').

Log, ship's, device for measuring speed L-179, picture L-180

term also used for record book L-180

Lo'gan, George (1753-1821), American statesman, born Stenton, Pa. (now a part of Philadelphia); U. S. senator from Pennsylvania 1801-07; his attempt to settle difficulties between France and United States (1798) without authority from the government led Congress to pass Logan Act, forbidding such activities by non-accredited persons.

Logan, James (1874-1751), American colonial politician, born Ireland; a Quaker and secretary to William Penn; chief justice of Supreme Court of Pennsylvania 1781-89; P-117

Logan, John (1725?-80), English name of Cayuga Indian chief, Tahgahjute; friend of whites until massacre of his family by whites 1774; leader in Dunmore's War.

Logan, John Alexander (1826-86), American Civil War general and U. S. senator, born Jackson County, Ill.; admitted to bar 1851; distinguished service in Civil War, except for 2-year interval was member of U. S. Senate 1871-86; candidate for presidential nomination on Republican ticket 1884; author 'The Great Conspiracy', dealing with Civil War Illinois statesman I-18
Loganberry L-180
Logania (*lō-gā-ni-ā*) family, or Loganiaceae (*lō-gā-ni-ā-sē-ē*), a family of plants, native chiefly to warm regions, including Carolina yellow jessamine, buddleia, pink-root, ignatius bean, strychnine, natal-orange, and summer lilac.
Logansport, Ind., industrial and railroad center 70 mi. n. of Indianapolis on Wabash and El rivers; pop. 20,117; trade in lumber and agricultural products; state institution for insane: map I-40
Logarithm, common, the expression of a number in terms of the power of 10: P-340. See also table on next page
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Logistics (*lō-gis'tiks*), in military science, details of moving, quartering, and supplying troops.
 "Log-rolling," in politics I-47-8, A-313
Logroño (*lō-grōn'yō*), Spain, ancient walled city in n. capital of province of same name; on River Ebro; pop. 34,000; wine trade: map S-226
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Lohengrin (*lō-ēn-grin*), in German legend, a knight of King Arthur's court L-181
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Loki (*lō'kē*), in Norse mythology, mischief-making god
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Lolach, a mudfish M-295-6
Lolland (*lō'lān*), also Laaland, Danish island in Baltic Sea; 479 sq. mi.; pop. 85,000: map D-53
Lollards, heretical society, arose at Antwerp in 14th century; held Bible as supreme; opposed Catholic system; forerunner of Protestantism
 Wyclif greatest leader W-191
Lomax (*lō'māks*), John Avery (born 1872, Goodman, Miss.) and his son, Alan (born 1916, Austin, Tex.), collectors of American ballads 'American Ballads and Folk Songs'; 'Cowboy Songs and other Frontier Ballads'; 'Negro Folk Songs'.
Lombard College, at Galesburg, Ill.; founded 1851; merged with Knox College 1930.
Lombard League, formed among cities of n. Italy against Frederick I F-190
Lombardo, Guy (Albert) (born 1902), orchestra leader, born London, Ontario; his orchestra ("Royal Canadians") noted for "sweet" music.
Lombardo Toledano, Vicente (born 1894), Mexican labor leader; professor law and philosophy National University of Mexico 1918-33: M-142a, b
Lombards, also Langobards ("long beards"), Germanic tribe which settled in n. Italy L-181
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 Napoleon crowned with N-9
Lombardy poplar P-304
Lombok, island of Netherlands Indies, e. of Bali; about 1810 sq. mi. pop. 620,000; rice, coffee, indigo, sugar: maps E-142, A-332a
Lombroso (*lōm-brō'sō*), Cesare (1836-1909), Italian criminologist, founder of science of criminal anthropology, originator of theory that there is a "criminal type" marked by physical signs ("The Criminal").
Lo'mond, Loch, largest lake in Scotland, in counties of Stirling and Dumbarton; 27 sq. mi.; length 23 mi.: map E-270a, picture S-44
Lomonosov (*lōm-ō-nō'sōv*), Mikhail Vasilievitch (1711-65), Russian poet and philologist; established basic principle of latter-day Russian language ('Ode on the Capture of Khotin'): R-196
London, John Griffith ("Jack") (1876-1916), novelist, born San Francisco; stories largely drawn from own career as sailor, tramp, stevedore, gold hunter, war correspondent; his voyage around world in small yacht told in 'The Cruise of the Snark' ('White Fang'; 'The Call of the Wild'; 'John Barleycorn', semi-autobiographical).
London, England, largest city in the world; capital British Empire; pop. 8,200,000: L-182-91, maps E-270a, E-326d
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London, Treaty of (1986) P-92, N-54
London, University of, educational institution at London, England; grew out of University College, founded 1827; by royal charter of 1836 had been examining body only, for conferring degrees; reorganized 1900 to include also teaching, research, and extension work: U-280
London Bridge, historic bridge over the Thames River, London; original, completed in early 13th century, bore rows of houses with chapel in center; present bridge, completed 1831, granite, 85 ft. wide with five arches of varying sizes
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N	0	1	2	3	4	5	6	7	8	9	D	N	0	1	2	3	4	5	6	7	8	9	D
1.0	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	42	5.5	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	8
1.1	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	38	5.6	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	8
1.2	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	35	5.7	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	8
1.3	1130	1173	1209	1259	1271	1303	1335	1367	1399	1430	32	5.8	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	7
1.4	1401	1402	1523	1533	1553	1584	1614	1644	1673	1703	30	5.9	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	7
1.5	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	28	6.0	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	7
1.6	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	26	6.1	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	7
1.7	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	25	6.2	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	7
1.8	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	24	6.3	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	7
1.9	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	22	6.4	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	7
2.0	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	21	6.5	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	7
2.1	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	20	6.6	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	7
2.2	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	19	6.7	8261	8267	8274	8280	8287	8293	8299	8305	8312	8319	6
2.3	3617	3636	3655	3674	3692	3711	3729	3747	3765	3784	18	6.8	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	6
2.4	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	18	6.9	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	6
2.5	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	17	7.0	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	6
2.6	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	16	7.1	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	6
2.7	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	15	7.2	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	6
2.8	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	15	7.3	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	6
2.9	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	15	7.4	8682	8688	8694	8700	8706	8712	8717	8723	8728	8733	6
3.0	4771	4786	4800	4814	4829	4843	4857	4871	4885	4900	14	7.5	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	6
3.1	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	14	7.6	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	6
3.2	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	13	7.7	8885	8891	8896	8902	8908	8913	8919	8924	8930	8935	6
3.3	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	13	7.8	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	6
3.4	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	13	7.9	8970	8976	8981	8987	8993	8998	9004	9009	9015	9020	5
3.5	5441	5453	5465	5477	5489	5502	5514	5527	5539	5551	12	8.0	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	5
3.6	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	12	8.1	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	5
3.7	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	12	8.2	9133	9138	9143	9148	9154	9159	9165	9170	9175	9180	5
3.8	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	11	8.3	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	5
3.9	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	11	8.4	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	5
4.0	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	11	8.5	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	5
4.1	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	10	8.6	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	5
4.2	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	10	8.7	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	5
4.3	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	10	8.8	9445	9450	9455	9460	9465	9470	9475	9480	9485	9490	5
4.4	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	10	8.9	9494	9499	9504	9509	9515	9520	9525	9530	9535	9540	5
4.5	6522	6532	6541	6551	6561	6571	6580	6590	6600	6610	10	9.0	9542	9547	9552	9557	9562	9567	9571	9576	9581	9586	5
4.6	6628	6637	6646	6655	6665	6675	6684	6693	6702	6712	0	9.1	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	5
4.7	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	9	9.2	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	5
4.8	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	9	9.3	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	5
4.9	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	9	9.4	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	5
5.0	6990	6998	7007	7015	7024	7033	7042	7050	7059	7067	0	9.5	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	5
5.1	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	8	9.6	9823	9827	9832	9836	9841	9845	9850	9854	9858	9863	5
5.2	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	8	9.7	9868	9872	9877	9881	9885	9890	9894	9898	9903	9908	4
5.3	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	8	9.8	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	4
5.4	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	8	9.9	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	4

Those unfamiliar with logarithms should read the general principles, especially about the mantissa and characteristic, in the article on Powers and Roots before using this table.

Finding logarithms of numbers. Locate the first two figures in the left-hand column and the third at the top. The corresponding four numbers in the table are the mantissa (mantissa of 1.51 is 1790). The characteristic is one less than the number of digits left of the decimal point. Thus the logarithm of 1.51 (usually written $\log 1.51 = 0.1790$; $\log 15.1 = 1.1790$; $\log 151 = 2.1790$; and so on).

For decimal fractions, the characteristic is one greater than the number of zeros between the decimal point and the first significant digit, and has a negative sign above the characteristic, with the mantissa in the table ($\log 0.151 = 1.1790$; $\log 0.0151 = 2.1790$; and so on).

With a number having four significant digits proceed by interpolation as follows: obtain the difference between the mantissas for the next smaller and next larger three-digit numbers; multiply this by the last digit of your number, divide by 10, and add the result to the logarithm for the first three digits of the number. Thus, to find $\log 15.13$. $\log 15.2 (=1.1818) - \log 15.1 (=1.1790) = 0.0028$, $\frac{3}{10} \times 0.0028 = 0.00084$. Adding: $1.1790 + 0.00084 = 1.17984$ ($= \log 15.13$ approx.). The column marked D at the right gives the average value for the difference between any two mantissas

on the line, and may be used (remembering to multiply, then divide by 10 as above) if less accurate results will suffice.

To find a number from its logarithm. Locate in the table the mantissa next below the one you have, write the three corresponding digits from the side and top, and point off decimally as the characteristic requires. For remaining digits, reverse the interpolation process given above. Thus, to find the number for the logarithm 1.17984. The next lowest mantissa is .1790, and the number (pointed off for characteristic 1) is 15.1. The difference between mantissas .1790 and .1818 is .0028. Divide by the difference you have: $\frac{0.0028}{0.00084} = 3.3$. Adding this after 15.1 (not to it), gives 15.133, the approximate answer.

Computing with logarithms. When all characteristics are positive, the computations proceed as explained in the article on Powers and Roots. When negative characteristics appear treat the characteristics and mantissas separately, and at the end combine any characteristic resulting from the mantissas with the others. Thus, to find 151×0.151 . To $\log 151 (=2.1790)$ add $\log 0.151 (=1.1790)$. Result: 1.3580 ($= \log$ of 22.8 approx.). To divide 0.151 by 151: from $\log 0.151 (=1.1790)$ subtract $\log 151 (=2.1790)$. Result 3.000 ($= \log$ of .001). To find the 7th power of 0.151: multiply $\log 0.151 (=1.1790)$ by 7. Answer: $7 \times 1.1790 = 8.2530 = 6.2580$ ($= \log$ of 0.0000179 approx.)

London Company, also known as Virginia Company of London, organized 1606 by King James I of England to establish colonies in North America between 34th and 41st degree of n. latitude; dissolved 1624. London Company was the s. branch of a joint land stock company of which the Virginia Company of Plymouth was the n. branch. See also *Index* Plymouth Company

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London Conference on Naval Armament

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1936 P-92, P-10

London County Council L-190

Lon'donderry, 2d Marquis of. See in *Index* Castlereagh

Londonderry, Northern Ireland, also Derry, port on Foyle River about 65 mi. n.w. of Belfast; pop. 48,000; linen manufactures; besieged by James II in 1689; chief town of county of Londonderry (804 sq. mi.; pop. 145,000): I-129, *map* E-270a

London Missionary Society C-234

London Round Table Conference on India G-5, I-40

Lono Scouts B-217

Lone Star State (Texas) T-53

Long, Crawford Williamson (1815-78), American physician and surgeon L-191, A-196

Long, Huey Pierce (1893-1935), American politician, born Winnfield, La.; governor of Louisiana 1928-31; U.S. senator 1931-5; nicknamed "the Kingfish"; shot to death by Dr. Carl A. Weiss, Jr.; statue of him presented by Louisiana to National Statuary Hall 1941 (autobiography "Every Man a King")
bridge at New Orleans named for N-100, *picture* B-240a
opposes F. D. Roosevelt's policies R-148f

Long, James (died 1822), American filibuster; invaded Spanish Texas (1819-21) proclaimed short-lived Texas republic at Nacogdoches.

Long, John Davis (1838-1915), American public official, born Buckfield, Me.; governor of Massachusetts 1880-88; member of Congress 1883-89; secretary of navy 1897-1902, during Spanish-American War.

Long, John Luther (1861-1927), American novelist and dramatist, born Pennsylvania ("Madame Butterfly"; "The Darling of the Gods").

Long, Stephen H. (1784-1864), American army surveyor and engineer, born Hopkinton, N. H.; led exploring expedition to Rocky Mts. 1819-20; discovered Longs Peak; authority on railroads: F-14
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Long Beach, Calif., city on s. coast about 20 mi. s. of Los Angeles; pop. 164,271: L-191, *map* C-28
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Long Branch, N. J., famous seaside resort on Atlantic coast 30 mi. s. of New York City; resident pop. 17,408: N-90, *map* N-90

Longchamps, or Longchamp (*lōn-shāṅ*'), part of the Bois de Boulogne, w. of Paris; site of an abbey founded 1260 by Isabel, sister of St. Louis, and suppressed 1792; now a race course.

Longcloth, plain, light-weight, closely woven cotton fabric; soft finish

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Long-horned beetles, beetles of the family *Cerambycidae*; most species have very long antennae

long-horned musk beetle, *picture* B-81

Longhouse, type of dwelling used by certain primitive people

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Longinus (*lōn-jīnūs*), Cassius (213?-273 A.D.), Greek critic G-174

Long iron, in golf, *picture* G-117

Long Island, N. Y., island s. of Conn.

forming s.e. portion of New York state; 1773 sq. mi.; pop. 4,600,022:

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motion picture center M-278

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Long Island Sound, arm of Atlantic between Long Island and mainland;

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Longitudinal pulses, sound S-195

"Long Knives" V-308

Long Lake, N. Y., in Adirondacks; 14 mi. long, 1 mi. wide: *map* N-114, *picture* N-115

Longleaf pine, Southern yellow pine, or Georgia pine P-220, 221, G-56

annual cut in U. S. U-194

Longman, Evelyn B. (born 1874), American sculptor, born Winchester, Ohio; designed bronze doors for chapel of U. S. Naval Academy.

Long measure, *table* W-67

Long-nosed monkey, or proboscis monkey M-230, *picture* M-229

Long Parliament C-149, P-79

Cromwell dismisses, *picture* C-401

Hampden H-208

"Rump" C-400-1, P-79

Long primer, size of type T-172

"Long-range" blockade B-157

"Longshanks," nickname of Edward I of England E-189

Longs Peak, Colo., one of highest peaks of Rocky Mts. (14,255 ft.), 50 mi. n.w. of Denver C-312

Longstreet, Augustus B. (1790-1870), newspaper editor and educator, born Augusta, Ga.; president Emory College and University of Mississippi ('Georgia Scenes').

Longstreet, James (1821-1904), Confederate Civil War general; distinguished himself at Bull Run, Fredericksburg, Chickamauga, and in battles of the Wilderness; U. S. minister to Turkey 1880-81; U. S. Railway Commissioner 1898-1904
Chickamauga battle C-255

Long-tailed panda Z-222, *picture* Z-224

Long-tailed shrew M-217

Long ton W-87

Longview, Tex., city 125 mi. e. of Dallas; pop. 13,758; oil production; plow, box, and canning factories.

Longview, Wash., city in s.w. at confluence of Cowlitz and Columbia rivers, in farming district; pop. 12,385; lumber, paper, creamery products, paint and varnish.

Longworth, Nicholas (1783-1863), American business man and horticulturist

grape culture in Ohio O-213

Longworth, Nicholas (1889-1931), American politician, grandson of above, born Cincinnati, Ohio; Ohio Republican congressman 1908-13, 1915-31; Speaker of House, 1925-31; married Alice Roosevelt 1906.

Lonicera (*lō-nīs'ēr-d*), the honeysuckle genus of plants H-332

Loofa, or luffa, sponge S-282

Lookout, Cape, in North Carolina, on island 70 mi. s.w. of Cape Hatteras N-158

Lookout Mountain, near Denver, Colo.

Buffalo Bill's tomb B-282

Lookout Mountain, ridge in n.w. Ga. extending into Tennessee and Alabama C-157

battle in Civil War C-157

cable railway, *pictures* C-156

Loom C-378-9

carpet weaving, *picture* P-113

development S-259; Cartwright C-90;

Industrial Revolution I-740, d

first power loom in America M-84

Guatemalan, *picture* G-181b

Jacquard S-259, *pictures* S-149; carpets R-174; imitation tapestry T-10; knitting K-33; lace L-47, *pictures* L-50-1

Navajo, *picture* A-294

oriental rugs R-171, *picture* R-173

primitive, *picture* T-61

silk, *pictures* S-149

tapestry T-10

wool, *picture* W-144

Looming, a form of mirage M-199

Loon, a diving water-bird L-198

"Loop," in Chicago C-187

Loop antennae, in radio R-23

Looper, or cankerworm C-72

Loos (*lōs*), small village in n. France, 1 mi. n.w. of Lens; scene of British offensive 1915; town captured but British lost about 70,000 men.

Loosestrifs, leafy-stemmed perennial herbs embracing the genus *Lythrum* of the primrose family; common loosestrife is *L. vulgaris*, a tall coarse plant with large yellow flowers in terminal leafy panicles; *L. nummularia* (creeping Charlie, moneywort, or creeping jenny) is a trailing plant with large yellow flowers often used in rock gardens.

Loosestrife family, or Lythraceae (*lōs-rā's'ē*), a family of plants, shrubs, and trees, native chiefly to tropical America, including swamp loosestrife, loosestrife, henna, crape-myrtle, cigar-flower, purple loosestrife, and blue waxweed.

Lop-eared rabbit, H-223

Lope de Vega. *See in Index* Vega Carpio

López (lō'pās), Carlos Antonio (1790-1862), dictator of Paraguay P-66

López, Francisco Solano (1826-70), dictator of Paraguay P-66

López Contreras (kōn-trā'rās), Eleazar (born 1838), president of Venezuela 1936- V-277

López de Legaspi, Miguel (1524-72), Spanish soldier, conqueror of Philippines and founder of Manila P-169

López de Villalobos (vél-yā-lō'bōs), Ruy (1500-44), Spanish navigator expedition to Philippines P-169

Lop Nor, or Lob Nor, shallow lake in Gobi Desert A-328, map C-211

Loquat (lō'kwāt), a small evergreen tree or shrub (*Eriobotrya japonica*) of the rose family and its fruit: F-212

Lorain', Ohio, port and industrial city on Lake Erie, 26 mi. w. of Cleveland; pop. 44,125; ships steel products, coal, lumber, iron ore, farm products; makes seamless steel, ships: map O-210

Loras College of Dubuque, at Dubuque, Iowa; Roman Catholic institution for men, founded 1839; formerly Columbia College; arts and sciences.

Lorea (lō'rē), ancient city in s.e. Spain on river Sangonera; pop. 61,000; trade center; scene of many battles between Christians and Moors: map S-226

Lord, a British title borne by bishops, marquises, earls, viscounts, and barons; also borne as courtesy title by eldest sons of dukes, marquises, and earls, and younger sons of dukes and marquises; title of office borne by lord chancellor and others.

Lord Dunmore's War, expedition by American colonists against Indian coalition formed to check expansion of Virginia into what is now Kentucky and West Virginia S-85

Lord Mayor, title given to mayors of cities of York, Dublin, and London; power of Lord Mayor of London extends only over ancient inner city; chosen annually from aldermen; inaugurated November 9, Lord Mayor's Day, in medieval splendor; chief duty to sustain hospitality of city residence of L-166

Lord Mayor's Day, England H-323

Lord Protector, Cromwell's title as head of the Commonwealth C-401

Lords, House of, upper house of British Parliament P-77-9

Home Rule Bill crisis G-98

Judicial Committee of C-385

Reform Bill crisis R-177

veto power limited L-174

Lord's Day S-1

Lord's Supper, or Holy Eucharist, in Christian church, a sacrament in which bread and wine are taken in commemoration of Christ's Last Supper.

Lorelei (lō'rē-lē), fabled Rhine siren; legend probably from an echoing rock of that name in the Rhine poem by Heine H-270-1

Lorentz, Hendrik Antoon (1853-1928), Dutch physicist; sought consistent theory for magnetism, electricity, and light; explained the Zeeman effect, and with Zeeman won the Nobel prize in physics for 1902.

Lorenz (lō'rēns), Adolf (born 1854), Austrian orthopedic surgeon; devised bloodless operation (forcible

manipulation) for congenital dislocation of hip joint; also operation for clubfoot.

Lorenzetti (lō-rén-tsét'ti), Ambrogio (active 1319-48), and Pietro (active 1305-46), two Sienese painters, brothers; noted chiefly for religious frescoes; Ambrogio was most gifted, and in vigorous, colorful, and naturalistic works showed influence of Giotto; he painted a series of allegories representing good and bad government.

Lorenzo, Saint. *See in Index* Lawrence

Lorenzo de' Medici (lō-rén't'sō dā mā-dē-chē) (1449-92), "the Magnificent" M-107, F-108

Leonardo da Vinci V-300

Michelangelo M-146

monument to Giotto G-90

Lorenzo de' Medici (1492-1519), duke of Urbino, grandson of Lorenzo the Magnificent

statue by Michelangelo F-107, picture M-107

tomb adorned by Michelangelo, picture M-147

Loretto Heights College, at Loretto, Colo.; Roman Catholic institution for women, founded 1890; arts and sciences.

Lorgnette (lōrn-yēt') S-240

Loricata (lōr-i-kā'tā), order of reptiles, also called Crocodilia, comprising the crocodiles, the alligators, and the gavials. Also suborder of edentates comprising the armadillos crocodiles C-399

Lorient (lō-rē-ān'), France, fortified naval port in n.w. on Scorff River at confluence with Blavet; pop. 45,000; large shipyards, arsenal; fisheries.

Lorimer, George Horace (1868-1987), American editor, born Louisville, Ky.; editor-in-chief of *Saturday Evening Post*, 1899-1936, and is given chief credit for its unusual success; wrote popular books on success ('Letters from a Self-Made Merchant to His Son'; 'Old Gorgon Graham').

Loring, Eugene, ballet dancer and choreographer, born Milwaukee, Wis.; real name LeRoy Kerpestein; danced with Fokine's ballet (1934) and later joined the Ballet Caravan, of New York City; chief choreographies are 'Yankee Clipper', 'Billy the Kid', and 'The Great American Goof'.

Loris, a species of short-tailed lemur.

'Lor'na Doone' (dōn'), novel by R. D. Blackmore which made the Exmoor country famous; the heroine is an heiress kidnaped by outlaws and brought up in their wilderness fortress.

Lorne (lōrn), Marquis of. *See in Index* Argyll, Duke of

Lorne, Firth of, inlet of Atlantic, w. coast of Scotland; terminus of Caledonian Canal: map E-270a

Caledonian canal S-44

Lorrain (lō-rān'), Claude (1600-82), French landscape painter; real name Claude Gellée: P-21

Lorraine (lō-rān'), district of n.e. France (also called Lotharinga and Lothringen) A-136-7. *See also in Index* Alsace-Lorraine

Charles the Bold invades C-153

extent in 643 G-71

Lory, any of a large group of parrots, chief genera *Domicella*, *Lorius*, *Trichoglossus*, *Chalopsitta*, and *Eos*; distinguished from other parrots by its brushlike tongue with which it extracts nectar from flowers; found chiefly in Australia and New Guinea.

Los Angeles (lōs ān'gē-lēs), Calif., largest city on Pacific coast; pop. 1,504,277: L-196-9, maps C-26, 28

government L-199

harbor L-198, 191

history L-109

industries L-196, 198

moving pictures L-198

rapid growth L-196

water supply, aqueducts A-236, C-28,

map C-28

'Los Angeles', a dirigible B-26, picture

B-28

Lossing, Benson John (1813-91), American historical writer; born Beekman, N. Y.; was newspaper editor, wood engraver, illustrator ('Pictorial Field-Book of the Revolution', pioneer historical work; 'Pictorial Field-Book of the War of 1812'; 'Pictorial History of the Civil War').

'Lost Battalion, The,' 554 men in 1st World War from the 77th (New York) Division, who were not lost, but cut off during advance and surrounded by enemy Oct. 2-7, 1918, during battle of the Meuse-Argonne; under command of Major Charles W. Whittlesey, troops refused to surrender in spite of repeated enemy attacks, lack of food, extreme cold, and mistakenly placed barrage attack from own army; when rescued only 194 men came out

Argonne battle A-262

pigeon takes message P-216

'Lost Colony of Virginia,' English colony in what is now North Carolina which disappeared in 1591; the 'Croatan Indians' in North Carolina claim to be descendants of an Indian tribe whom these colonists joined and with whom they intermarried; thus an explanation is given for the mixed blood and occasional English names of the Croatans: N-159

'Lost Dauphin' L-203

Lost tribes of Israel J-216

Lot, Abraham's nephew A-4

Lota (lō'tā), Chile, mining town and seaport about 20 mi. s. of Concepción; pop. 25,000; coal-mining and coal-shipping: map C-206

Loterio d' Angleterre (lōt-rē'dān-glā-tēr'), famous diamond, picture D-63

Lothair I (795-855), Holy Roman emperor, grandson of Charlemagne; became joint ruler 817 when Louis I, his father, divided the Empire among his sons; after years of strife with his brothers received Italy and imperial title together with lands along Rhine and Rhone rivers (Partition of Verdun, 843) jewelry picture G-27

Lothair II, sometimes called Lothair III (1070?-1137), emperor 1133-37; created duke of Saxony 1106, and elected German king 1125; a strong, capable ruler, whose reign was regarded as a golden age for Germany.

Lothair II (825-869), king of Lorraine, son of Lothair I; received as his kingdom district w. of Rhine between North Sea and Jura Mts., called after him Lotharinga or Lorraine (German Lothringen).

Lotharinga. *See in Index* Lorraine

Lothario (lō-thā'ri-ō), in Rowe's tragedy 'The Fair Penitent', handsome, perfidious libertine, the proverbial 'gallant, gay Lothario.'

Lothian, Philip Henry Kerr, 11th Marquis of (1682-1940), British statesman; member of Liberal party; secretary to prime minister Lloyd George 1916-22; under-

secretary of state for India 1931-32; ambassador to U.S. 1939-40; advocated closer Anglo-American cooperation in 2d World War.
Lothringen. See in *Index* Lorraine
Loti (*lô-tê*), Pierre, pen name of Louis Marie Julien Viaud (1850-1923), French naval officer and novelist; exquisite stylist; master of description; his colorful and romantic novels deal largely with people and experiences in foreign lands he visited, particularly the East ('The Marriage of Loti'; 'Madame Chrysanthème'; 'Disenchanted'; 'The Iceland Fisherman'); F-198
Lottery, gambling scheme in which a sum of money is paid for the chance of drawing a prize of greater value than the amount invested; now illegal in the United States.
Lotus L-199
Lotus eaters L-199
Odysseus' men O-204
Lotze (*lôt'sê*), Rudolf Hermann (1817-81), German philosopher; assumed that the orderly functioning of nature implied a motivating, ideal principle; contributed to development of physiological psychology.
Loubet (*lô-bê*'), Emile (1858-1929), French statesman, 7th president of French Republic (1899-1906); remitted Dreyfus' sentence.
Loucks, Henry L. (1846-1928), American farmer and politician, leader of agrarian movement; settled 1884 on homestead in Deuel County, Dakota Territory; founder of *Dakota Ruralist*; president National Farmers' Alliance 1892; leader of successful fight for initiative and referendum in South Dakota.
Loudness, of sound S-196
Loud-speaking apparatus
 motion pictures, *pictures* M-283
 radio R-24
Lough (*lôx*), Irish name for lake; same as Scottish loch.
Louis, Saint. See in *Index* Louis IX
Louis I, Holy Roman emperor. See in *Index* Louis I, the Pious, king of France
Louis II (827-75), emperor (crowned 850) and king of Italy (came to throne 839), son of Lothair I; fought Saracens and restored order in Italy.
Louis III, the Blind (880?-928), emperor (crowned 901) and king of the Lombards (chosen 900), grandson of Louis II; his eyes were put out 905 by Berengar, rival king of the Lombards; thereafter lived in exile in Provence.
Louis IV, the Bavarian (about 1287-1347), emperor (crowned 1328) and king of Germany (elected 1314); despite his being almost constantly at war, first with his brother over Bavaria, then with the Pope over Germany, Louis increased the boundaries of his domains and fostered trade and learning.
Louis (*lô'é*), kings of Bavaria. See in *Index* Ludwig
Louis, the German (804-76), king of the East Franks; 3d son of Louis the Pious and grandson of Charlemagne; his share of Charlemagne's empire after Partition of Verdun (843) formed nucleus of modern Germany.
Louis I, the Pious (778-840), king of France and Holy Roman emperor, youngest son of Charlemagne; L-200, C-146
Louis VI, the Fat (1078-1137), France L-200

Louis VII (1120-80), France L-200
 iris adopted as emblem I-130
 Second Crusade C-404
Louis VIII (1187-1226), France L-200
Louis IX (1215-70), "Saint Louis," France; festival August 24: L-200-1 in *Crusades* C-406
Louis X (1289-1316), France, son of Philip IV; ruled 1314-16.
Louis XI (1423-83), France L-201
 Charles the Bold opposes C-153
 private postal system P-320
Louis XII (1462-1515), France L-201
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Louis XIII (1601-43), France L-201
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 Richelieu R-105-6
 Thirty Years' War T-80
Louis XIV (1638-1715), France L-201-2
 Colbert aids C-298-9
 court etiquette E-310
 engraving of period E-295
 furniture of period I-101, *picture* I-99
 James II aided by J-183
 La Salle explores the Mississippi L-67
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 Man in the Iron Mask I-147
 Marquise de Maintenon M-41
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 Versailles palace V-289
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Louis XV (1710-74), France L-202
 builds Petit Trianon V-289
 furniture of period I-102
 textile design T-67
 Voltaire V-335
Louis XVI (1754-93), France L-202-3, F-201, 202
 calls Estates-General E-305, F-201
 furniture of period I-102, *picture* I-100
 Marie Antoinette M-64
 Mirabeau M-197
 popularized potato P-324
 Robespierre demands death R-117
 textile design T-67, *picture* T-68
Louis XVII (1765-95?), "the lost dauphin" L-203
Louis XVIII (1755-1824), France L-203
 Talleyrand T-6
Louis I (1832-89), king of Portugal; came to throne 1861; abolished slavery in Portuguese colonies.
Louis II (born 1870), Prince of Monaco, succeeded to throne of principality of Monaco, 1922.
Louis, Joe (Joseph Louis Barrow) (born 1914), boxing champion, born Lexington, Ala. B-212
Louis Napoleon N-11. See also in *Index* Napoleon III
Louis Philippe (*lô-ê fê-lêp'*) (1778-1850), "citizen-king" of France L-203
Louisburg, shipping port and fishing village on Cape Breton Island, Nova Scotia; pop. 971; important fortress during French ownership captured 1745 by American colonists K-22
 captured 1758 by British N-180; Wolf at W-129
 founded A-162
Louise (1776-1810), queen of Frederick William III of Prussia; her beauty, goodness, and fortitude in misfortune made her a German heroine; Napoleon's rudeness to her after his conquest of Prussia hardened resolve of her son William I to humiliate France after the Franco-Prussian War, 64 years later.

Louise, Lake, Alberta, Canada, *pictures* C-48, C-50
Banff National Park N-22f
'Louise', opera by Charpentier story O-231
Louisiade (*lô-ê-sê-âd'*) Archipelago, group of islands off s.e. coast of New Guinea, belonging to Papua: map A-372a
Louisiana (*lô-ê-sê-ân-â*), a gulf state of the U. S.; 48,523 sq. mi.; pop. 2,363,880; cap. Baton Rouge: L-204-8, maps L-206, U-188c
 agriculture L-204-8
 bird, state B-122
 Chalmette Historical Park N-21
 cities L-207: list L-204. See also in *Index* names of cities
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 muskrat raising F-228
 name, origin of, and nickname S-279
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Louisiana College, Baptist institution at Pineville, La.; founded 1908; liberal arts.
Louisiana paroquet, also parakeet P-82
Louisiana Polytechnic Institute, at Ruston, La.; state institution founded 1894; arts and sciences, education, engineering, economies.
Louisiana Purchase L-208-9, A-187-8, map U-242
 effect on New Spain S-224, N-103
 Lewis and Clark explore L-99-100
Louisiana Purchase Exposition, at St. Louis, from April 30 to December 1, 1904; recorded admissions were 19,694,855; amusements on the "Pike"; 500 buildings, most of them architecturally very fine; floral clock with 50-ft. hands
 Forest Park site of S-10
Louisiana State University and Agricultural and Mechanical College, at Baton Rouge, La.; opened 1860; arts and sciences, law, agriculture, engineering, pure and applied sciences (including Audubon Sugar School), medicine, dentistry, pharmacy, commerce, library science, teachers college, graduate school
 Audubon Sugar School L-204
 campanile, *picture* L-205
Louis styles, names of various period furniture I-101-2
Louisville, Ky., largest city of state on Ohio River; pop. 319,077: L-209, map K-11
Louisville, University of, at Louisville, Ky.; founded by decree of the city council in 1837; liberal arts, medicine, law, dentistry, engineering, graduate school.

Lounsbury, Thomas Raynesford (1838-1915), American scholar, born Ovid, N. Y.; professor English language and literature, Sheffield Scientific School of Yale Univ. for more than 30 years; especially distinguished for his studies in development of English language ('History of the English Language'; 'Studies in Chaucer'; 'The Text of Shakespeare').

Lourdes (*lqrd*), France, city 82 mi. s.w. of Toulouse; pop. 12,000; place of pilgrimage for Roman Catholics, who believe that the Virgin Mary appeared here in 1858 and that miraculous cures have since taken place at her shrine; famous grotto and spring; Church of the Rosary; pilgrims have numbered over half million in a single year; feast day of Our Lady of Lourdes, Feb. 11.

Lourenço Marques (*lô-rên'sô mâr-kês*), capital of Mozambique (Portuguese East Africa); pop. 45,000; M-294, maps A-42a, E-139

Louse, a wingless blood-sucking insect of the order *Siphunculata* (also called *Anophura*); eggs are called "nits"; name also applied to other insects

bird P-68
body P-67-8, picture P-69
crab, picture P-69
eggs (head louse), picture E-193
plant A-226. See also in Index
Aphids

Louvain (*lô-vân*) (Flemish Leuven), city in cent. Belgium; pop. 41,000; L-209, map B-37

Louvain, University of, at Louvain, Belgium, founded 1425; leading scientific institution of medieval Europe, having 6000 students in 16th century; famous department of Roman Catholic theology; active in Counter-Reformation; suppressed during French Revolution, but reestablished 1817
library L-209, picture E-90

L'Ouverture, Toussaint. See in Index
Toussaint

Louvois (*lô-vô*'), François Michel Le Tellier, Marquis de (1641-91), French statesman, Louis XIV's great war minister and evil genius, who wasted prosperity of France and destroyed peace of Europe for military "glory."

Louvre (*lô-vrû*), art museum in Paris E-328

art treasures, pictures E-333: 'Diana', picture E-335; Goujon's 'Fountain of the Innocents', picture S-59; 'Mona Lisa' V-300; Holbein's 'The Astronomer', picture E-318; Prud'hon's portrait of the Empress Josephine J-228; tapestry, picture T-11; Victory of Samothrace S-53, picture S-55
exterior, picture E-333
Hall of Augustus, picture E-330

Louys (*lô-ês*) Pierre (1870-1925), French poet and novelist; founded at 19 a review 'La Conquête'; famous for novel 'Aphrodite', which was produced as an opera; also wrote 'Astarte'; 'Psyche'; 'Les Chansons de Billitis'; 'Les Aventures du Roi Pausole'; and other sensuously beautiful books.

Love, god of, Cupid, or Eros C-413-14

Love-bird P-82, color plate P-83-4

Love-in-a-mist, a flower. See in Index
Nigella

Lovejoy, Elijah Parish (1802-37), American abolitionist, born Abillon, Maine; editor of an anti-slavery paper at Alton, Illinois; killed by mob: C-250

Lovelace, in Richardson's 'Clarissa', the hero-villain, a wealthy young libertine.

Lovelace, Francis (1613?-1675?), English governor of colonial New York 1668-1673; fostered trade but became extremely unpopular for his high taxes.

Lovelace, Richard (1618-58), English Cavalier poet, immortalized by two lyrics ('To Lucasta, on Going to the Wars'; 'To Althea from Prison').

Love-Hes-bleeding, a hardy annual garden herb (*Amaranthus caudatus*) with pretty drooping clusters of dark purplish flowers; native to the tropics.

Lovely fir. See in Index Silver fir

Loveman, Robert (1864-1923), American poet, born Cleveland, Ohio; lived great deal of life in south; wrote simple poems of nature ('Songs from a Georgia Garden'; 'On the Way to Willowdale').

'Love of the Three Kings, The', opera by Montemezzi

final scene, picture O-233
Mary Garden as Flora, picture O-231
story O-229

Lover, Samuel (1797-1868), Irish novelist and poet; tendency to caricature makes his pictures of Irish life not entirely truthful. 'Handy Andy', a roaring farce dealing with an Irish servant lad's drollery; 'Rory O'More', with its brave, cheerful peasant hero, equally popular as novel and play.

'Love's Labour Lost', comedy by Shakespeare, written about 1591, in which princess of France and her three ladies cause King Ferdinand of Navarre and his three friends to break vows; humorous complications follow
chronology and rank S-100e

Lovett, Robert Morris (born 1870), American educator and writer, born Boston, Mass.; professor of English, University of Chicago 1909-36; appointed general secretary of Virgin Islands 1939 ('A History of English Literature', with W. V. Moody; 'Richard Gresham' and 'A Winged Victory', novels; 'Edith Wharton', criticism).

Low, Juliette Gordon (1860-1927), founder of Girl Scout movement in the U. S., born Savannah, Ga.; married William Low, Englishman, and lived in England
Girl Scouts G-93

Low, Seth (1850-1916), American merchant, educator, and administrator, born Brooklyn; mayor of Brooklyn 1882-86 (enforced first municipal civil-service rules; adopted in America); president Columbia University 1890-1901; mayor of Greater New York 1901-03.

Low, Will Hickok (1858-1932), American decorative painter, designer of stained glass, and illustrator, born Albany, N. Y. (illustrations for Keats' 'Lamia'; frieze in legislative library, New York state capitol).

Low, in weather forecasting, regions of lowest atmospheric pressure
W-60, map W-60a

Low Archipelago. See in Index
Tuamotu

Low-boy, in furniture I-105, A-169

Low Countries, English equivalent of "Netherlands," formerly applied to Belgium, Holland, and Luxemburg.

Lowden, Frank O. (1861-1943), American lawyer and political leader, born Sunrice City, Minn.; from

poor farm boy became successful lawyer, notable Congressman; governor of Illinois 1917-21; actively engaged in farming and in promotion of coöperative marketing, and in solution of farm problems.

Lowe, Sir Hudson (1769-1844), English general, fought throughout Napoleonic wars, conspicuous in campaigns of 1813 and 1814; custodian of Napoleon on St. Helena.

Lowell, Abbott Lawrence (1856-1943), American educator and political scientist, born Boston; president of Harvard 1909-38; restricted elective system; developed social life among students through freshman dormitories ('The Government of England'; 'Governments and Parties in Continental Europe'; 'Conflicts of Principle').

Lowell, Amy (1874-1925), American poet and critic, born Brookline, Mass., sister of A. L. and Percival Lowell; leader of Imagist movement in America; mastered technique of free verse; awarded Pulitzer prize 1926 ('Sword Blades and Poppy Seeds', 'Pictures of the Floating World', 'What's O'Clock', poems; 'Tendencies in Modern American Poetry', criticism; 'John Keats', biography): A-182, picture A-181

Lowell, Francis Cabot (1775-1817), Boston merchant, founder of U. S. cotton manufacturing industry; born Newburyport, Mass.

Lowell, Mass. named for L-210

Lowell, James Russell (1819-91), American poet, essayist, and critic L-209-10, A-178
abolitionist writings C-250
'Elgion Papers' L-210; quoted C-250
estimate of Holmes E-324
home at Elmwood, picture A-270
quoted C-250, L-139

Lowell, John (1748-1802), American jurist, said to have been author of clause in Massachusetts state constitution declaring "all men are born free and equal"; this clause was interpreted in 1783 by the Supreme Court of state to mean that slavery was abolished; father of Francis Cabot Lowell and grandfather of James Russell Lowell.

Lowell, Percival (1855-1916), American astronomer, born Boston; brother of Amy and A. L. Lowell; lived in Japan 1888-93 ('The Genesis of Planets')
predicted presence of ninth planet
A-350

Lowell, Mass., one of greatest textile manufacturing centers of U. S.; at junction of Concord and Merrimack rivers; pop. 101,989; state teachers college: L-210, map M-82

Lowell Observatory A-288
Pluto discovered by P-233

Lower Austria, a province in former Austria, now Ostmark, Germany; 7452 sq. mi.; cap. Vienna.

Lower California. See in Index
California, Lower

Lower Canada, name formerly given to province of Quebec Q-5, C-59-60

Lower case letters T-173, A-135

Lower Egypt, that part of Egypt north of 30° n. latitude E-198

Lower Palatinate. See in Index
Palatinate

Loves, John Livingston (born 1867), American educator and author, born Decatur, Ind.; professor of English literature Harvard University 1918-39; noted for critical works on Chaucer, Shakespeare, Coleridge ('The Road to Xanadu'; 'Goofrey Chaucer and the Development of

- His Genius'; 'Essays in Appreciation'; 'Art of Geoffrey Chaucer'; 'Of Reading Books and other Essays').
- Lowestoft** (*lō'stōft*), England, seaport and summer resort of Suffolk, 110 mi. n.e. of London; pop. 42,000; important fisheries; captured by Cromwell 1648; Dutch fleet defeated by Duke of York 1665; map E-270a
porcelain P-334
- Low German**, dialect G-60
- Lowlands**, of central Scotland S-44
- Lowland white fir**. See in Index *Giant fir*
- Lownsbury**, Eloise (born 1888), writer, born Paw Paw, Ill.; brings medieval history to life in her books for boys and girls; 'Boy Knight of Reims', picture of France in the days of Joan of Arc; 'Out of the Flame', brilliant court life of Francis I.
- Low relief**, *hasso-rilievo*, or *bas-relief* S-52, pictures S-52, 53, 54
- Lowry Field**, U. S. Army Air Corps technical school at Denver, Colo.; established 1937.
- Loyalist**, or *Tory*, in American colonies R-86, P-291, picture R-85 after Revolution R-92, C-59
- Loyalists**, United Empire. See in Index *United Empire Loyalists*
- Loyal Legion**, Military Order of the, patriotic society founded 1865 at Philadelphia, Pa. on the day following Lincoln's assassination; organized by U.S. Army and Navy officers; membership limited to such officers and their direct male descendants; purposes: fellowship among and welfare of U.S. soldiers and sailors, care of widows and orphans of deceased members.
- Loyal Order of Moose**. See in Index *Moose*, *Loyal Order of*
- Loyalty**, to one's country. See in Index *Patriotism*
- Loyalty Islands**, Pacific group in Melanesia, belonging to France, 60 mi. e. of New Caledonia; 800 sq. mi.; exports copra, rubber; map A-372a
- Loyola** (*loi-ō'lā*), Ignatius de (1491-1556), founder of Jesuit Order; festival July 31: L-210-11
burial place R-143
converts Francis Xavier X-197
Counter-Reformation L-211, R-65, 87
- Loyola College**, at Baltimore, Md.; Roman Catholic (Jesuit) institution for men, founded 1852; arts and sciences.
- Loyola University**, at Chicago, Ill.; Roman Catholic (Jesuit) institution, founded 1876; arts, commerce, law, medicine, dentistry, sociology chapel, picture C-194
- Loyola University of Los Angeles**, at Los Angeles, Calif.; Roman Catholic (Jesuit) institution for men, established 1929; arts and sciences, business, law.
- Loyson** (*lōd-sōn'*), Charles (1827-1912), French preacher, called "Père Hyacinthe"; eloquent speaker but his unorthodox beliefs caused his excommunication from Roman Catholic church.
- Lozeau** (*lō-zē*'), Albert (1878-1924), Canadian poet and journalist, born Montreal; an invalid from youth; ranks high among Canadian poets for sensitiveness and imagination.
- Lozier**, Jean Baptiste Charles Bouvet de. See in Index *Bouvet de Lozier*, *Jean Baptiste Charles*
- Lubang Islands**, group on s.w. coast of Luzon, Philippine Islands; chief island Lubang (66 sq. mi.) commands entrances to Manila Bay.
- Luba's**, town of Luzon, P. I.; in rice and sugar district; pop. 29,000.
- Lubber line**, in navigation C-326
- Lubber's knot**, or *granny knot* K-34
- Lubbock**, Sir John. See in Index *Avebury*, *John Lubbock*
- Lubbock**, Percy (born 1879), English writer; style influenced by Proust and Henry James; best known for 'Earlham', a book of reminiscences; edited the letters of Henry James.
- Lubbock**, Texas, city 110 mi. s. of Amarillo in rich agricultural and stock-raising section; pop. 31,853; cotton and cotton products, packed meats, grain feeds; Texas Technological College.
- Lilbeck** (*lī'bēk*), Germany, city on Trave River 12 mi. from Baltic Sea; one of Prussia's important seaports; pop. 121,000; many fine medieval buildings; diversified manufacturers; B-234, map G-66
head of Hanseatic League H-212
- Lilbeck**, Germany, former state, since 1937 part of Prussia.
- Lublin**, David (1849-1919), agricultural organizer, born Klodowa, Russian Poland; brought to U. S. in 1855; founded dry-goods and mail-order business in California, 1874; devoted last part of his life to agricultural problems. See in Index *Agriculture*, *International Institute of*
- Lublin** (*lū-blēn'*), Poland, city 95 mi. s.e. of Warsaw; pop. 120,000, one-half Jews; flourished in 12th century; scene of Russian victory over Austrians in 1st World War; map B-326e
- Lubricant**, any oily or greasy substance used to diminish friction L-211, P-149, 151
bearings and A-133
castor oil C-95
graphite G-136
- Lubrication system** of automobile A-404
- Luca della Robbia**. See in Index *Robbia*
- Lu'can** (Marcus Annaeus Lucanus) (39-65 A.D.), Roman poet, author of 'Pharsalia', epic on civil war between Caesar and Pompey.
- Lucania**, ancient name applied to modern department in s. Italy, formerly known as Basilicata; cap. Potenza; area, 9850 sq. mi.; pop. 545,000; I-181, map I-156
- Lucas**, David (1802-81), English engraver; friend of Constable: C-346
- Lucas**, Edward Verrall (1868-1938), English essayist, novelist, and biographer; "the modern Charles Lamb"; widely popular for his genial humor and broad sympathies ('The Open Road'; 'Life of Charles Lamb'; 'London Laverder').
- Lucas**, Frederic A. (1852-1929), American scientist, born Plymouth, Mass.; after serving as curator in several museums, became director American Museum Natural History, New York, 1911-23 ('Animals of the Past'; 'Animals before Man in America').
- Lucas**, John Seymour (1849-1923), English historical and portrait painter painting, picture W-102
- Lucas Van Leyden** (Lucas Jacobsz) (1494?-1583), Dutch painter and engraver, friend of Dürer.
- Lucia** (*lū-kā*), old and picturesque city in n. Italy, 12 mi. n.e. of Pisa; pop. (commune) 81,000; many antiques; large trade; map I-158
textile industry T-64
- Luce**, Clare Boothe. See in Index *Boothe*, *Clare*
- Lucerne** (*lū-sēr'n*), also *Luzern*, Switzerland, capital of canton of Lucerne at n.w. end of Lake Lucerne; pop. 47,000; favorite tourist resort; map S-351
'Lion of Lucerne' T-85, picture T-85
- Lucerne**, Lake of (Vierwaldstättersee), famous and beautiful mountain-rimmed lake in central Switzerland; 24 mi. long; map S-351
- Lucerne**, or *alfalfa* A-116-8. See also in Index *Alfalfa*
- Lucia**, Santa (*sān'tā lū-chē'ā*) See in Index *Lucy*, *Saint*
- 'Lucia di Lammermoor'** (*lū-ohē'dā lā-mār-mōr'*), opera by Gaetano Donizetti story O-231
- Lucian** (*lū'shān*) (120?-180? A.D.), Greek satirist and humorist G-174
- Lucifer** (*lū'si-fēr*), name of Venus as morning star; applied by Isaiah to king of Babylon ("How art thou fallen from heaven, O Lucifer, son of the morning!"), and, through misunderstanding of this passage by later writers, to Satan.
- Luciferase**, an enzyme manufactured in the cells of certain animals, the function of which is to control that slow process of oxidation known as bio-luminescence or luminescence: P-176
- Luciferin**, a chemical substance occurring in luminescent animals, which, when acted upon by the enzyme luciferase, produces light: P-176
firefly F-69
- Lucretius Gaius** (180?-103 B.C.), Roman satirist L-68
- Lucite**, a synthetic plastic P-246
- Luethardt**, Arno Benedict (born 1885), physiologist, born Chicago, Ill.; professor of physiology, University of Chicago after 1923; with J. Bailey Carter discovered value of ethylene gas as an anesthetic.
- Luettner**, Felix von, Count (born 1886), naval officer and adventurer, born Dresden, Germany; became sailor at age of 13; gained title of "Sea Devil" by daring exploits in 1st World War; lived in U. S. for several years; returned to German naval service 1940 (hero of 'The Sea Devil', by Lowell Thomas).
- Lucknow**, British India, manufacturing and rail center, chief city of United Provinces in n. cent. India; pop. 275,000; famous for heroic defense in Indian Mutiny; L-211, maps I-30, A-332o
brass work, picture C-361
- 'Lucky Hans'**, a German folk-tale, retold by Grimm.
- Lucretia** (*lū-kre'shī-dā*), Roman matron whose suicide because of outrage inflicted by Sextus, son of King Tarquin the Proud, provoked expulsion of the Tarquins.
- Lucretia Borgia** (1480-1519), Duchess of Ferrara B-195
- Lucretius** (*lū-kre'shī-ūs*) (Titus Lucretius Carus) (96?-55 B.C.), Roman poet-philosopher L-69
contributions to physics P-198
- Lucullus** (*lū-kūl'ūs*), Lucius Licinius (110?-56? B.C.), immensely wealthy Roman noble, conqueror of Mithridates; "Lucullan luxury" has become proverbial.
- Lucy**, Saint (Italian, *Santa Lucia*) (283?-304?), noblewoman of Syracuse, Sicily; two attempts at torturing her having failed, she was finally killed by sword; festival December 13.

Lucy, Sir Thomas (1532-1600), English squire, justice of peace, said to have prosecuted Shakespeare S-95

Lud, legendary king of Britain L-184-5

Lud'dites, bands of workmen organized in England to smash machinery 1812-18 in protest against displacement of hand labor.

Ludendorff, Erich von (1865-1937), German general L-212 attempt at military dictatorship G-75

Liège W-154

offensive of 1918 W-162

Lüderitz (Wü'd-rêts), seaport in Southwest Africa on Angra Pequena Bay; founded by German merchant, Lüderitz, in 1882; pop. about 5200; diamond mines; railroad terminus: map A-42a

Lud'ington, Mich., commercial city and resort on Lake Michigan and Marquette River 75 mi. n.w. of Grand Rapids; pop. 8701; salt, watch cases and jewelry, game boards, furniture, house and kitchen utensils; airport: map M-153 car ferries M-155

Lud'low, England, old town in s. Shropshire; ruined castle, once stronghold against Welsh.

Ludovico il Moro (lq-dō-vē'kō ēl mō'rō), duke of Milan (1479-1500), patron of Leonardo da Vinci V-300

Ludwig (Wü'vix) I (1786-1868), king of Bavaria, munificent patron of art; forced to abdicate by revolution in 1848

beautifies Munich M-301

Ludwig II (1845-86), Bavaria, grandson of Ludwig I; patron of Richard Wagner; became insane and committed suicide.

Ludwig III (1845-1921), Bavaria; cousin of Ludwig II; succeeded 1918, abdicated 1918.

Ludwig, Emil (born 1881), German-Jewish author, born Breslau; lived early life in Switzerland; became U. S. citizen 1941; in his youth wrote plays, sketches, and novels but found greatest success in his "humanized" historical biographies, including those of Napoleon, Bismarck, Goethe, Lincoln; 'Gifts of Life', autobiography.

Ludwig, Otto (1813-65), German dramatist and novelist, one of leading German writers of fiction in middle 19th century ('The Hereditary Forester', prose tragedy; 'Between Heaven and Earth', novel; 'The Maccabees', poetic tragedy).

Ludwigshafen (Wü'vix-hā-fēn), chief city of Rhine Palatinate, Bavaria, on Rhine opposite Mannheim; world's largest chemical works and other manufactures; large trade in coal, timber, iron; pop. 102,000.

Lufbery, Raoul (1884-1918), American aviator, leading American "ace" in 1st World War.

Luffa, or loofa, sponge S-262

Luffing, in sailing B-165

Luftwaffe (Wü'f'vā-fū), German air force, including antiaircraft units. Word means "air weapon."

Lugano (lq-gū'nō), Lake of, deep narrow lake enclosed by mountains, partly in Switzerland, partly in n. Italy, between lakes Maggiore and Como; 20 mi. long: picture I-171

Lugbait. See in Index Lobworm

Lugh (lū) the Long-Handed, Irish sun-god I-132

Lug pole, camp cooking device C-47a

Luini (lq-ē'nē), Bernardino (1475?-1522?), Italian artist; most noted as a fresco painter; excelled at de-

pecting sacred and mythological subjects.

Lufenda River, Mozambique, Africa, map E-139

Luke, Saint, one of apostolic assistants, traditional author of the Third Gospel and of the Acts; festival October 18: A-229

Luke, Gospel of Saint, Third Gospel and 3d book of New Testament A-229

Lukeman, Henry Augustus (1871-1935), American sculptor, born Richmond, Va.; successor to Gutzon Borglum in charge of Confederate memorial, Stone Mountain, Ga.; portrait busts, statues, monuments (portrait statue of William McKinley; equestrian statue of Kit Carson; 'Manu the Law Giver of India'.)

Lukas, George Benjamin (1867-1933), American painter, born Williamsport, Pa.; war correspondent and illustrator in Spanish-American War. His paintings of poorer classes, street scenes, portraits, and his remarkable interpretations of childhood show free, virile, and spontaneous technique ('The Spielers'; 'Blue Devils Marching up Fifth Avenue'; 'Old Clothes Man').

Luktehnum, a depressed basin in n.w. China, nearly 400 ft. below sea level.

Lulea (lq-lē-ō'), Sweden, seaport on Gulf of Bothnia; pop. 11,000; shipbuilding; lumber and iron: map N-173

ice-bound in winter S-337

Lule (lq'lē) River, in n. Sweden; 200 mi. to Gulf of Bothnia: map N-173

Lull (lq'lē), Giovanni Battista (French, Jean Baptiste Lully) (1639-87), celebrated composer, born Italy, called "father of French opera"; taken to Paris as boy, worked as servant; rose to position of court musician to Louis XIV; introduced lively ballets; dominated French opera for almost a century: O-228

Lully, Raymond (Raimon Lull, or Raymundus Lullius) (1235-1315), Catalan (Spain) scientist and missionary; authority on Arabic; founder of western orientalism forerunner of modern chemists C-178

Lumarith, a synthetic plastic P-246

Lumbar vertebra, vertebra in the region of the loins S-155

Lumber and timber L-212-19. See also Forests and forestry; Lumbering; Wood; also names of trees

commercial varieties L-218

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grading L-218, picture L-217

hardwood F-154-5, pictures T-132-35; greatest center in U. S. M-114

pine most useful to man P-219-21

plywood P-264

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Canada C-56, pictures C-53-4; British Columbia B-246; New Brunswick N-81; Ontario O-227; Quebec Q-3

Finland F-44

Germany G-67-8

Norway N-178, 174

Philippine Islands P-169

Russia R-180

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ture M-245; national forests F-154, 156, table F-250; New Hampshire N-86, picture N-88, chart N-86; New Mexico N-98; North Carolina N-157; Oregon O-246, picture O-245; Pennsylvania P-114; Tennessee T-46, M-114, picture T-47; Texas T-54, picture T-55; Virginia V-306; Washington W-29, picture W-31; West Virginia W-77; Wisconsin W-124

quarter-sawn flooring B-267

reforestation and reserves

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seasoning or drying L-218, pictures L-217

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Bunyan, Paul, stories B-276, S-303k-l, p, F-135-6

derrick for lifting logs, pictures L-214, 215, T-55

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hauling logs L-218, pictures C-133b, N-88, L-213, 214; trains, pictures C-54, M-245

"high riggers" work L-218

loading logs for shipment L-218, pictures L-213, 214, S-215

logging camp to sawmill L-213, 218, pictures L-213-17

logs piled for sawmill, picture T-47

rafts or "booms" L-218

riding logs, picture C-54

sawmill L-218, pictures L-216, 217, A-297; first in U. S. W-49; portable, picture M-40

Lumberjack, a lumberman

Paul Bunyan tales B-276, F-135-6, S-303k-l

work of L-212-18. See also in Index Lumbering

Lu'mon, unit of light intensity L-125

Lumière (lū-mē-yēr'), Auguste Marie Louis Nicolas (born 1862), French chemist and industrialist; brother of Louis Jean, whom he helped in the development of the cinematographe (see below); research on vitamins.

Lumière, Louis Jean (born 1864), French chemist and industrialist; in 1895 invented cinematographe, the first motion picture projector using intermittent movement of film; pioneer (1907) in natural color photography.

Lu'minal, a narcotic drug N-12

Lumines'cence, or bio-luminescence, the emission of light by living organisms as the result of the slow oxidation of certain substances manufactured by them: P-176

Luminiferous ether L-128, R-13, C-265

Lu'minous paint P-32

Lummis, Charles Fletcher (1859-1928), American explorer and writer, born Lynn, Mass.; spent latter half of life in Southwest and became an authority on history and archeology of that region; learned language and customs of Indians and did much to improve their conditions ('The Land of Poco Tiempo'; 'The Man Who Married the Moon, and Other Pueblo Indian Folk-Stories'; 'Mesa, Cañon and Pueblo').

Lumplin, Tony, character in Goldsmith's comedy 'She Stoops to Conquer', a coarse, ignorant country youth, fond of practical joking.

Lumpsucker, a mail-cheeked fish of the splny-finned group, picture F-71

Key—cāpe, āt, fār, fōst, whāt, fāll; mē, yēt, fērn, thēre; hē, bīt; rōw, wōn, fōr, nōt, dē; cāre, bāt, ryde, full, bārn;

- Lu'na**, in Roman mythology, the goddess of the moon and of months.
- Lunacharsky** (*lŭ-nă-chăr'shē*), Anatoly Vasilievich (1875-1934), Russian politician and author; of wealthy parents, became revolutionary in 1892; as people's commissar for education in soviet government prevented destruction of books, works of art after revolution; promoted instruction of people.
- Luna moth** B-284, color plate B-285a-b
- Lunar caustic**, or silver nitrate, a cauterizing antiseptic S-152
- antidote for F-84**
- used for mirrors M-199
- Lunaria** (*lŭ-nă-rī-ă*), a genus of plants of mustard family, native to Eurasia, and one of common flowers of old-time gardens. Heart-shaped leaves; tiny, scented purple or white flowers; seed pod 2 in. long, transparent; used as everlasting. Also called moonwort, honesty, satin flower, and silver dollar.
- Lunar month**, or synodic month M-249
- Lun'dy**, Benjamin (1789-1839), an American philanthropist, prominent in anti-slavery movement, born Hardwick, N.J.; published anti-slavery magazine and lectured against slavery in many states.
- Lundy's Lane**, battle of, engagement in War of 1812, between British and American forces near Niagara Falls on Canadian side W-10
- Lüneburg** (*lŭ-nă-bŭrk*), district of e. Hanover, Prussia; contains Lüneburger Heide (Lüneburg Heath), about 55 mi. long.
- Lüneburg**, Germany, town of Hanover 22 mi. s.e. of Hamburg; pop. 29,000; was prominent member of Hanseatic League; cement works, salt spring.
- Lunéville** (*lŭ-nă-vēl'*), town of n.e. France 18 mi. s.e. of Nancy; pop. 24,000; treaty between France and Austria (1801).
- Lung**, artificial, for submarine work, picture S-314
- Lung-fish**, or mudfish, a fish with both gills and lungs M-295-7, pictures M-298, 297, F-68
- Lungs**, organs of respiration in air-breathing animals
- artificial, Lindbergh's invention L-147
- human L-219, R-78-80
- land crab C-388
- lung-fish F-70
- snail S-188
- spider, picture S-255
- Lungwort**, Virginia cowslip, or bluebell, a perennial plant (*Mertensia virginica*) of the borage family with large pale-green leaves, and loose clusters of purplish-blue trumpet-shaped flowers; often cultivated in gardens; an extract derived from the leaves was used by old herbalists in treating lung diseases.
- Lunt**, Alfred (born 1893), American actor, born Milwaukee, Wis.; starred with wife, Lynn Fontanne, in Theatre Guild productions and in moving pictures ('Elizabeth the Queen'; 'Reunion in Vienna'; 'The Guardeman').
- Lupercalia**, Roman spring festival in honor of ancient god Lupercus, protector of flocks against wolves, sometimes identified with Faunus
- St. Valentine's Day, origin S-11
- Lupescu**, Elena (Magda) (born 1904), Jewish-Rumanian woman, former stenographer, whose influence over King Carol II played important part in recent history of Rumania; fled with him into exile 1940.
- Lupines**, various plants of the bean family, with white, yellow, or blue flowers on a central spike; contain poison
- how to plant G-10
- Lupu'tin**, an alkaloid, the active principle of hops H-338
- Luque** (*lŭ-kă*), Hernando de, partner of Pizarro P-228
- Luray' Cavern**, large limestone cave in Page County, Va., celebrated for stalactites, picture C-117
- Lurçat** (*lŭr-să*), André (born 1894), French modern architect; works both utilitarian and esthetic; vigorous style, well-balanced proportions.
- Lurs** (*lŭrs*), nomadic people of Persia, probably of Aryan origin P-130, 131
- Lusaka** (*lŭ-să-kă*), capital of Northern Rhodesia; pop. about 5000: map A-42a
- 'Lu'shad'**, epic by Camoens P-314
- Lusitania** (*lŭ-si-tă'si-ă*), ancient Roman province comprising most of modern Portugal and s.w. Spain.
- 'Lusitania'**, British ocean liner, torpedoed and sunk by Germans May 7, 1915 W-159, 188, W-108-9
- Lusters**, candle chandeliers A-172
- Lusterware** P-330
- Lute**, ancient pear-shaped stringed instrument of Arabian origin, pictures M-308, 317
- popularity M-310
- Lute'clum**, a rare metallic element of the "rare earth" group, table C-168
- Lutes**, Della Thompson (?-1942), American writer, born Jackson, Mich.; 'The Country Kitchen', 'Home Grown' depict life on a Michigan farm in the 70's.
- Lutetia** (*lŭ-tē'shē-ă*), ancient name of Paris, France P-75
- Lutisk** (*lŭt'fisk*), Scandinavian dish C-229a
- Luther** (*lŭ-tēr*), Hans (born 1879), German statesman; in 1924 concluded Dawes loan for Germany; chancellor 1925-26; instituted taxation and tariff reform; president of Reichsbank 1930; ambassador to U.S. 1933-37.
- Luther**, Martin (1483-1546), leader of Protestant Reformation L-220-1, R-65-8, pictures L-220, G-60, R-88
- Charles V opposes C-147
- Christmas tree legend C-227
- Dürer D-121
- educational reforms E-175
- Henry VIII opposes H-278
- holidays for, in Germany H-323
- hymn composer M-310
- influence on German language G-62
- Wittenberg tower, to which famous theses were tacked, picture L-221
- Zwingli Z-232
- Lutheranism**, religious movement that grew out of teachings of Martin Luther
- America C-233
- Denmark D-52
- early spread of R-88, T-80
- Norway N-178
- number of adherents R-72
- Sweden S-338, 339
- Luther College**, at Decorah, Iowa;
- Lutheran; founded 1861; liberal arts.
- Luther League of America**, an organization of several Lutheran Young People's Societies established 1895 at Pittsburgh, Pa.; originally non-synodical; adopted by United Lutheran Church in America, 1920.
- Luton** (*lŭ-tŭn*), England, town 30 mi. n.w. of London; pop. 63,000; chief seat of English straw-plait manu-
- facturing; map E-270a
- Lutnamian** (*lŭ-tŭ-nă-m'i-ă-n*), a linguistic stock of Indians comprising the Klamath and Modoc tribes.
- Lutyens**, Sir Edwin L. (1860-1944), British architect, born London; famous as designer of public buildings and homes; planned New Delhi, India; works include Government House, New Delhi, Whitehall Cenotaph, London, and British Embassy, Washington, D.C.; Royal Academy 1920, Order of Merit 1943
- plan of Delhi D-44
- Lützen** (*lŭt'sēn*), Germany, town in Saxony; battle in Thirty Years' War (1632) G-190
- Luxembourg** (*lŭk-săh-bŭr'*) Palace, Parle P-74
- gardens, picture P-74
- Rubens decorates gallery R-170
- Luxemburg**, House of, famous royal line L-222
- Luxemburg**, Rosa (1870-1919), German (Jewish) socialist agitator, cripple, but a fiery orator; killed in Berlin riots.
- Luxemburg**, also Luxembourg, grand duchy of n.w. Europe, surrounded by France, Germany, and Belgium; 999 sq. mi.; pop. 300,000: L-221-2, map E-87
- flag F-95, color plate F-89
- invasion by Germany W-178a
- iron mines I-138
- Luxemburg**, also Luxembourg, capital of grand duchy; pop. 58,000: L-221
- Lux'or**, village in Upper Egypt on part of site of ancient Thebes, near Karnak; famous for splendid ruins: C-17-18, E-208, map E-197
- statue of Rameses II, picture E-210
- Luzern**, Switzerland. See Lucerne
- Luzón** (*lŭ-sŭn*), largest and most important of Philippine Islands; 40,814 sq. mi.; contains Manila, capital of islands: P-184, 168, maps A-332c, P-10b, P-188
- Japanese gain W-178a
- Lwów** (*lŭf*), Poland, formerly Lemberg, fortified city 185 mi. e. of Cracow; pop. 315,000; formerly capital of Austrian Galicia; university; strategic point in 1st World War, held by Russians (1914-15): P-277, map E-326c
- Lyautey** (*lŭ-ē-tē*), Louis Hubert, (1854-1934), French marshal; as resident-general and high commissioner of Morocco (1912-25) put government on sound basis.
- Lycabettus** (*lŭ-kă-bēt'ŭs*), Mount (modern Mount St. George), hill n.e. of ancient Athens 1112 feet high; modern section of city spreads to its base; reservoir on its side built by Hadrian and Antonius Pius still in use; picture A-354
- Lycée** (*lŭ-să*), French school E-173
- American college compared C-301
- Lyceum** (*lŭ-sē-ŭm*), Aristotle's school in ancient Athens A-284, G-174
- continued under Theophrastus G-174
- Lyceum**, an organization for popular instruction C-163
- Lychnis** (*lŭk'nis*), scarlet. See in Index Jerusalem cross
- Lychnis coronaria**, scientific name of mullein pink, a tall biennial of pink family with oval or oblong leaves and clusters of showy rose-colored flowers.
- Lycia** (*lŭ-ti-ă*), ancient division of s.w. Asia Minor on Mediterranean; conquered by Persia 6th century B.C., then subject in turn to Macedonia, Egypt, Syria, and Rome.
- 'Lycidas'** (*lŭ-ti-ds*), poem by Milton commemorating death of his friend Edward King, drowned at sea.

ŭ=French u, German ü; gŏm, gŏ; thŭn, thŭen; ŭ=French nasal (Jean); sh=French j (z in azure); x=German guttural oh

Lycoperdon bovista, a mushroom, color plate M-308a-b

Lycopodium, a genus of non-flowering moss-like plants of the club moss family (*Lycopodiaceae*) with trailing stems and numerous small evergreen leaves; the sulphur-yellow, highly inflammable powder-like spores produced by the erect fruiting spikes are sometimes used in making fireworks.

Lycoris (*H-kō'ris*), a genus of perennial plants of the amaryllis family, native to eastern Asia. Root a bulb; leaves long, narrow, disappearing before flowers develop; flowers yellow, red, or rose-lilac, fragrant, grow in cluster at top of tall stem, stamens project beyond flower tube; one species called golden spider-lily.

Lycurgus (*H-kū'r-gūs*) (9th century B.C.), lawgiver of ancient Sparta L-222

Ly'dda, or Ludd, ancient city of Palestine, 10 mi. s.e. of Jaffa; pop. 14,000

legend of St. George G-54

Ly'ddite, an explosive derived from picric acid.

Ly'dgate, John (1373?-1450?), English poet, scholar, and monk, born at Lydgate near Newmarket; contemporary of Chaucer and acknowledged him as his "master"; voluminous writer; style rough, verbose, and lacking in prosodic harmony; founder of English literary school between Chaucer and Spenser ('Troy Book'; 'Fall of Princes')

'Canterbury Tale', picture C-160

Ly'dia, ancient kingdom in Asia Minor; early seat of Asiatic civilization with important influence on Greeks; later part of Roman province of Asia; maps G-154, B-8 Croesus rules C-399

earliest known coins M-220

Lydia Langulish, in Sheridan's comedy 'The Rivals', a sentimental romantic heiress.

Ly'dian stone. See in Index Touchstones

Lye (H), a caustic, particularly potassium or sodium hydroxide. See also in Index Caustic potash

antidote F-64

soaps S-175, 177

Ly'ell, Sir Charles (1797-1875), British geologist; his studies and evidence established Hutton's "uniformitarian" theory of earth's evolution as foundation of modern geology; proof of inorganic evolution led, in hands of Darwin and others, to idea of organic evolution Darwin's debt to D-16

Ly'le, David A. (1845-1937), American military officer, born Lancaster, Ohio; attained rank of colonel 1907; inventor of Lyle life-saving gun.

Lyle gun, a life-saving cannon L-123-5, picture L-124

Ly'ly (*H'l'i*) or Lilly, John (1553?-1606), English romancer and dramatist who introduced into English literature the fantastic style of writing called "euphuism" 'Euphuus' N-181

Lyman, Edna. See in Index Scott, Edna Lyman

Ly'me (*Hm*) grass, or wild-rye, a coarse perennial grass of erect growth found in temperate climates; used as ornamental plant.

Ly'me Regis (*Hm rē'gīs*), seaport town of Dorsetshire, England, 135 mi. s.w. of London; fine, sandy beach; popular summer resort; settlement dates from 8th century; pop. 8000.

Lymph, a colorless liquid exuded through the capillaries to nourish tissues of the body: B-157b, P-206 found in bones B-172

Lymphatic glands, small glands scattered throughout lymphatic system, but especially in the neck, armpits, groin, thighs, and body organs; produce corpuscular elements of lymph, including white corpuscles.

Lymphatic system, a system of vessels for collecting lymph and carrying it back into the blood: B-157b, P-206-7 lacteals P-206

Lymphocytes, in blood B-157a, b

Lynbrook, N.Y., resort city on shore of Long Island, near New York City; pop. 14,557; chiefly residential.

Lynch, Charles (1736-96); American politician and soldier

"lynching" named from L-223

Lynch, Thomas (1749-79), signer of Declaration of Independence; born South Carolina.

Lynchburg, Va., industrial city on James River 95 mi. s.w. of Richmond in mountain pass; pop. 44,541; trade center, with large tobacco interests; shoes, paper board and bark extract, textiles, hosiery; Randolph-Macon Woman's College, Lynchburg College; supply depot for Confederates during Civil War: V-306, map V-306

Lynching L-222-3

Lyngen (*Hing'en*) Flord, in n. Norway, near Tromsø; has high flanking cliffs.

Lynn (*Hn*), Mass., a shoe manufacturing city of U. S., near Boston; pop. 98,123: L-223, map M-82

Lynnhaven Bay, on coast of Virginia w. of Norfolk

oysters V-304, 306, O-265

Lynwood, Calif., city 10 mi. s.w. of Los Angeles and about 11 mi. from ocean; pop. 10,982; incorporated 1921; manufacturing and oil field area; thermostats, oil well tools, pottery.

Lynx (*Hnks*), a large catlike animal with short tail and tufted ears L-223

cat family characteristics C-95-6

Ly'nn, Mary (1797-1849), American educator and pioneer in higher education for women, born near Buckland, Mass.; began to teach at 17. With some outside assistance in 1837 opened Mt. Holyoke Female Seminary (later Mt. Holyoke College) to give higher education to middle class girls.

Lyon, Nathaniel (1818-61), American soldier, prominent opponent of "states' rights" and slavery, born Ashford, Conn.; organized Unionist troops in Missouri; killed while leading charge against Confederates in battle of Wilson's Creek saves Missouri for the Union M-210

Lyonesse (*H-ō-nēs*), fabled land in Arthurian legends, off s. coast of Cornwall, England; said to have been engulfed by the sea.

Lyons (*Hōnz*), France, in French Lyon (*Hē-ōn*), 8d city of France, noted for silks; at junction of Rhone and Saône rivers; pop. 570,000: L-224, picture F-175 textile industry T-67, L-224

Ly'ra, or Lyre, constellation across North Pole from Little Bear; represents lyre of Orpheus or of Mercury: charts S-275d, e, h

Lyre (*Hr*), harplike instrument of Greeks, picture M-322

legendary invention H-286

Orpheus and O-251-2

Lyre-bird L-224, color plate P-64-5

Ly'rical Ballads' (1798), volume of poems by Wordsworth and Coleridge W-146

children's literature, place in L-180

Ly'ric poetry, P-271

Greek G-172

music of M-306

Lyrids, a meteor group M-128

Lysander (*H-sān'dēr*) (died 395 B.C.), able unscrupulous Spartan admiral; defeated Athens at Aegospotami and terminated Peloponnesian War, becoming most powerful man in Greece; killed at outbreak of Boeotian War before he could make himself supreme.

Lysias (*Hs'i-ds*) (459-380 B.C.), one of great Attic orators; originator of eloquent but plain style in Greek rhetoric.

Lysippus (*H-sip'ūs*) (4th century B.C.), Greek sculptor G-168

Hercules H-283, picture S-55

"Ly'sol," a disinfectant C-289

Lys (*Hs*) River, a tributary of the Scheldt; rises in extreme n. of France and flows n.e. 120 mi. past Armentières and Courtrai, joining Scheldt at Ghent; scene of terrific fighting in 1st World War; axis of 2d German offensive (April 9-26) in 1918: map W-151

1st World War W-162

Lyte, Henry Francis (1793-1847), British divine and hymn-writer; author of 'Poems, Chiefly Religious', 'The Spirit of the Psalms' and the popular hymns 'Abide with me', 'Jesus I my cross have taken'.

Lythracene (*Hth-rā'sē-ē*). See in Index Loosestrife family

Lythrum (*Hth'rūm*), or purple loosestrife, a perennial plant (*L. salicaria*) of the loosestrife family, found from New England to Utah. Grows to 8 ft.; leaves narrow, 4 in. long; flowers purple, in dense spikes, with each floret borne in axil of a tiny leaf; also called spiked loosestrife.

Lyt'ton, Oliver (born 1893), British industrialist; named minister of state 1941 and minister of state supervising war production in Britain's War Cabinet Feb. 1942.

Lyt'ton, Edward George Earle Bulwer-Lytton, first Baron (1803-73), English novelist, playwright, and politician; member of Parliament 1831-41, 1852-66; made secretary for the colonies 1858; as writer best known for historical novels, vivid and interesting, but inclined toward sensationalism ('Last Days of Pompeii'; 'Harold, the Last of the Saxon Kings'); also wrote successful plays ('Lady of Lyons', 'Richelieu', 'Money').

Lytton, Edward Robert Bulwer-Lytton, Earl of (1831-91), English statesman and poet, son of the preceding; viceroy of India 1876-80; better known under pen name of "Owen Meredith" ('Lucile', sentimental novel in verse).